New Jersey
Department of Community Affairs

SUPERSTORM SANDY COMMUNITY DEVELOPMENT BLOCK GRANT – DISASTER RECOVERY

Public Law 113-2; January 29, 2013
FR-5696-N-01; March 5, 2013
FR-5696-N-06; November 18, 2013
FR-5696-N-11; October 16, 2014

ACTION PLAN AMENDMENT NUMBER 22 - SUBSTANTIAL AMENDMENT FOR REBUILD BY DESIGN MEADOWLANDS PROJECT

- **Rebuild by Design Meadowlands Project Update**

PUBLIC COMMENT PERIOD: April 22, 2017 to May 22, 2017
DATE SUBMITTED TO HUD: _____
DATE APPROVED BY HUD: _____

Chris Christie
Governor

Kim Guadagno
Lt. Governor

Charles A. Richman
Commissioner

101 South Broad Street, P.O. Box 800
Trenton, NJ 08625-0800

This Substantial Amendment to the Action Plan (as proposed) will be available for public review at www.state.nj.us/dca/. It will be made available in English, Spanish, and Korean.

For those who otherwise cannot obtain a copy of this Substantial Amendment to the Action Plan, the Department of Community Affairs will make copies available upon request. Requests for copies should be directed to the following address:

New Jersey Department of Community Affairs
1st Floor Information Desk
101 South Broad Street
Trenton, New Jersey 08625

The State will consider comments received in writing or via email on the proposed Substantial Amendment to the Action Plan. Comments on the proposed Plan will be accepted until May 22, 2017 at 5:00pm Eastern Standard Time (EST). Written comments can be submitted to the Department of Community Affairs via email at sandy.publiccomment@dca.state.nj.us, or to the attention of Lisa Ryan, NJ Department of Community Affairs, 101 South Broad Street, PO Box 800, Trenton, New Jersey 08625-0800.

A summary of all comments received and written responses will be included in the final version of this Substantial Amendment submitted to the US Department of Housing and Urban Development (HUD) for approval.

HUD requires the State to hold a public hearing on the proposed Substantial Amendment to the Action Plan. The date, time, and location of the hearing is:

May 11, 2017
5 – 8 pm EST
Little Ferry Borough Hall
215-217 Liberty St
Little Ferry, New Jersey

Once the comment period closes, the State will synthesize and respond to the comments it received in the final version of this Substantial Amendment to the Action Plan, and will submit the final Plan to HUD for approval.

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SECTION 1: BACKGROUND

1.1 Procedural History

The Hurricane Sandy Rebuilding Task Force created the Rebuild by Design (RBD) competition in the summer of 2013 to develop ideas to improve the physical, ecological, and economic resilience of regions affected by Superstorm Sandy. The competition had two goals: (1) to promote innovation by developing flexible solutions that would increase regional resilience; and (2) to implement proposals with both public and private funding dedicated to the RBD effort. To realize the RBD initiative, the US Department of Housing and Urban Development (HUD) set aside Community Development Block Grant – Disaster Recovery (CDBG-DR) funds allocated through the Federal Sandy Supplemental legislation to develop and incentivize implementation of RBD projects.

HUD engaged multi-disciplinary teams composed of architects, designers, planners, and engineers. HUD charged these teams with proposing regional and community-based projects that would promote resilience in various Sandy-affected areas. The teams included experts from around the world. The teams' proposals, developed with and by the communities where the projects were focused, were submitted to HUD. HUD ultimately selected six "winning" projects. Two of those projects were in New Jersey: one focused in the Hudson River region (RBD Hudson) and the other focused in the Meadowlands region (RBD Meadowlands).

On October 16, 2014, HUD issued *Federal Register* Notice FR-5696-N-11 (effective October 21, 2014). This Notice allocated $881,909,000 of third round CDBG-DR funds to New Jersey. Of that total, $380 million was designated for the two RBD projects in New Jersey: RBD Hudson (allocated $230 million by HUD) and RBD Meadowlands (allocated $150 million by HUD). Comprehensive information about the RBD process and the winning projects is available on the RBD website (www.rebuildbydesign.org).

Pursuant to FR-5696-N-11, the State of New Jersey (herein after referred to as the State) prepared Substantial Amendment 12 to its CDBG-DR Action Plan. Substantial Amendment 12 was required to generally:

- Provide RBD Project Descriptions
- Identify Implementation Partnerships
- Identify Leveraged or Reasonably Anticipated Funds for RBD Projects
- Provide Project Timelines
- Include Citizen Participation Plans.

At the time of the submission of Substantial Amendment 12 in February 2015, the ability to provide specific project descriptions beyond the RBD proposals, identify other funding sources, and estimate project timelines was premature. Thus, FR-5696-N-11 required that each of the above elements be updated with a more detailed description for each RBD project in a subsequent RBD Substantial Action Plan Amendment in order to release funds for construction. Along with the subsequent Substantial Action Plan Amendment, FR-5696-N-11 requires the State to certify that it will adequately fund the long-term operation and maintenance (O&M) of the RBD project from reasonably anticipated revenue, recognizing that O&M costs must be provided from sources other than CDBG and CDBG-DR funds.

FR-5696-N-11 and its clarifying guidance also required that the subsequent Substantial Action Plan Amendment include an examination of the RBD project through a HUD-approved benefit-cost analysis (BCA).

HUD approved Substantial Amendment 12 on April 20, 2015. This current document provides the required Substantial APA that addresses the information required and now available concerning the RBD Meadowlands project.

1.2 Substantial Action Plan Amendment 22

Pursuant to FR-5696-N-11, the State is required to submit a Substantial Action Plan Amendment to HUD by June 1, 2017 that reflects the updated RBD project overview as a condition for release of funds for project construction.

The New Jersey Department of Environmental Protection (NJDEP) is currently conducting a Feasibility Study and preparing a Draft Environmental Impact Statement (DEIS) in order to identify a preferred alternative for the RBD Meadowlands project in the Fall of 2017. Pursuant to FR-5696-N-01, HUD is allowing grantees to submit a DEIS after they have submitted their subsequent Substantial APA. In accordance with FR-5696-N-11, this Substantial APA submits the following updates to Substantial Amendment 12 with regard to the RBD Meadowlands project:

- Description of Project Alternatives Under Review
- Updated Implementation Partnerships
- Identification of Leveraged or Reasonably Anticipated Funds
- Updated Project Timeline;
- Specific Citizen Outreach Plan
- Benefit Cost Analysis Approach

The RBD Meadowlands Project Team will continue to analyze and screen the Project Build Alternatives, as well as the No-Build Alternative. It is anticipated that a Preferred Alternative will be identified in the Fall of 2017. In accordance with FR-

5696-N-11, after a Project Alternative is identified, the RBD Meadowlands project will submit another Substantial Action Plan Amendment detailing the Final Project Description and Benefit Cost Analysis, as well as any updates to the Project Timeline, Leveraged or Reasonably Anticipated Funds, and Specific Citizen Outreach Plan.

The RBD Hudson River project previously submitted a separate Substantial Action Plan Amendment, known as APA 20, for the RBD Hudson project. APA 20 identified a preferred alternative and provided other updated project information for that project.

Finally, to the extent required in order to ensure that RBD funding is used in compliance with applicable Federal and State laws and regulations, the State incorporates here all applicable provisions of its CDBG-DR Action Plan, including provisions of Section 6 of the Action Plan applicable to RBD initiatives, as modified by Amendments 1 – 20.

From here forward, the Substantial APA for the RBD Meadowlands project is referred to as APA 22.

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SECTION 2: RBD MEADOWLANDS PROJECT: "PROTECT, CONNECT, GROW"

2.1 Purpose and Need

The purpose and need statement for the RBD Meadowlands project: "Protect, Connect, Grow" (referred to herein as "the Project" or "the RBD Meadowlands Project") was formulated through a comprehensive process. This process began with the development of the original, award-winning proposal submitted to HUD for funding, continued through the scoping process, and will continue through the concept and alternative development process for the DEIS. Key stakeholders, including local elected officials, agencies with regulatory authority, community leaders, and the general public, have been, are, and continue to be involved at each stage of this process.

The Project Area of RBD Meadowlands is depicted in **Figure 1**. The Project Area includes the Boroughs of Little Ferry, Moonachie, Carlstadt, and Teterboro, and the Township of South Hackensack, all in Bergen County, New Jersey. The Project Area includes approximately 5,405 acres and has the following approximate boundaries: the Hackensack River to the east; Paterson Plank Road to the south; State Route 17 to the west; and Interstate 80 and the northern boundary of the Borough of Little Ferry to the north. The Project Area is vulnerable to flooding from both coastal storm surge and inland rainfall events.

2.1.1 Purpose

The Project includes the construction and operation of flood risk reduction measures in the Project Area. These measures are designed to address the impacts of coastal and systemic inland flooding on the quality of the physical, natural, cultural, and socioeconomic environment of the Project Area due to both storm hazards and sea level rise. Therefore, the purpose of the Project is to reduce flood risk and increase the resiliency of the communities and ecosystems within the Project Area, thereby protecting critical infrastructure, residences, businesses, and ecological resources from the more frequent and intense flood events anticipated in the future.

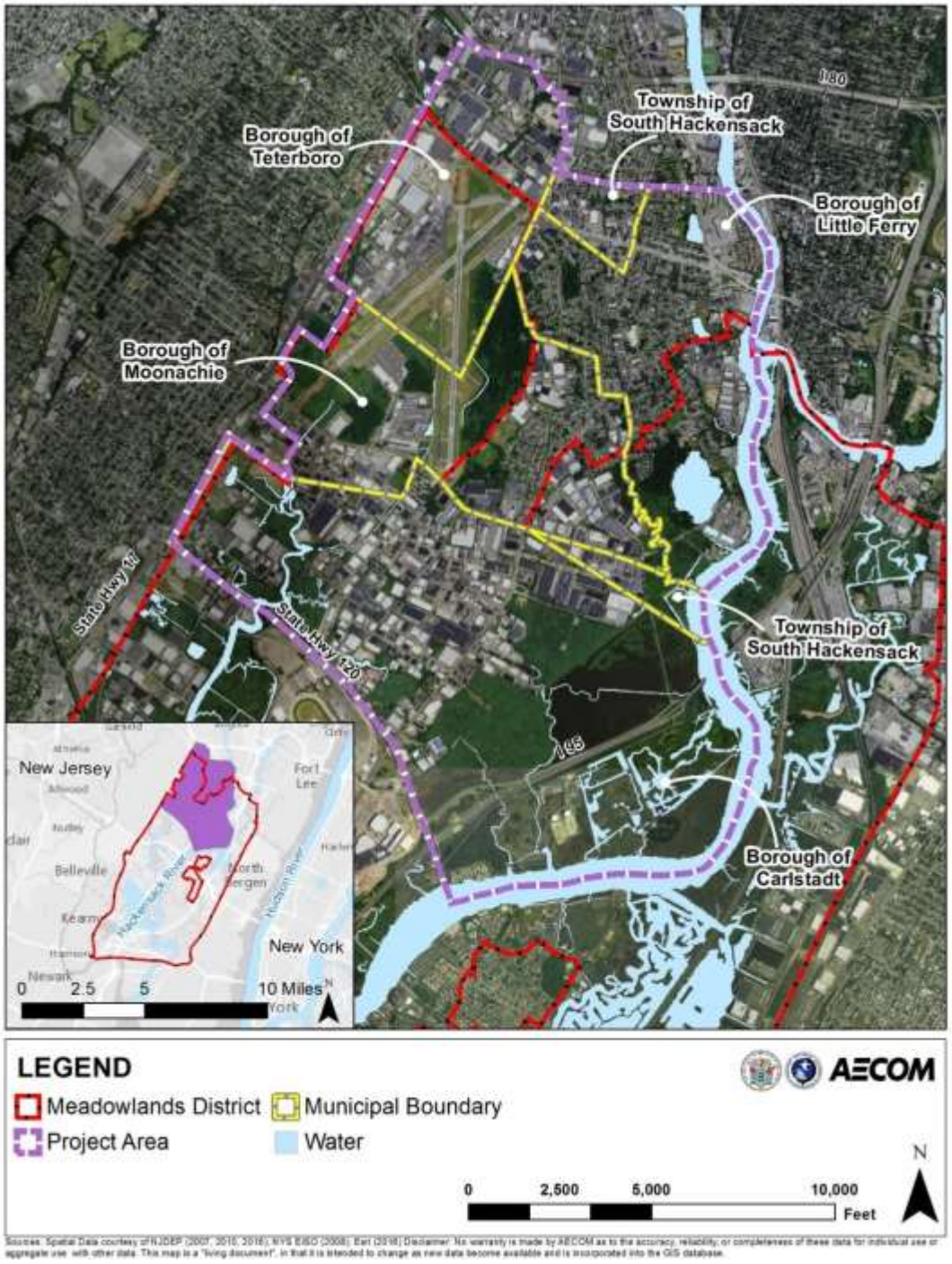


Figure 1. RBD Meadowlands Project Area

2.1.2 Need

The Meadowlands are situated in a valley or "bowl" with ridges on its sides that run parallel in a southwest to northeast direction. In some locations, these ridges are over 100 feet above sea level. Comprised of mostly flat terrain, elevations within the Meadowlands do not exceed 10 feet above sea level (North American Vertical Datum of 1988 [NAVD 88]), with most areas less than 6 to 7 feet above sea level (NAVD 88). Flow of water within the Project Area is greatly affected not only by local topography, but also by patterns of urbanization and development. In addition, historic construction of dikes and tide gates in an attempt to control and reduce flooding events has further affected the integrity and spatial configuration of the Project Area and altered its biodiversity. Additionally, existing surface water conveyances within the Project Area are undersized, clogged with sediments, and/or under-utilized. These conditions further compound the drainage challenges within the Project Area.

The majority of the Project Area, including critical community infrastructure, is within the Federal Emergency Management Agency (FEMA)-designated 100-year floodplain (see **Figure 2**). The Project Area's exposure to flood hazard risks is evident by the number of properties included in the FEMA National Flood Insurance Program (NFIP). Mortgage lenders for properties within the Special Flood Hazard Area (i.e., Zone AE) require property owners to obtain flood insurance from the NFIP. In addition, property owners receiving awards following presidentially declared disasters (such as Superstorm Sandy) are also often required to obtain NFIP insurance.

The interrelationship between coastal flooding and rainfall events contributes to the recurring flooding conditions throughout the Project Area. Each component represents challenges and needs to be addressed within the context of an overall flood reduction strategy for the Project Area. As such, the Project is needed to address: (1) systemic inland flooding from high-intensity rainfall/runoff events; and (2) coastal flooding from storm surges and abnormally high tides.

In addition to reducing flooding in the Project Area, the Project is needed to directly protect life, public health, and property in the Project Area. The Project seeks to include concepts and alternatives that are consistent with the local municipalities' overall effort to reduce FEMA Flood Insurance Rates.

The Project is further needed to increase community resiliency, including protecting accessibility to, and on-going operations of, critical health care services, emergency services, and transportation and utility infrastructure.

The Project could also deliver co-benefits through the protection of ecological resources and enhancement of water quality, which in turn could benefit regional

biodiversity and ecosystem resiliency. In addition, the Project could potentially integrate the flood hazard risk reduction strategy with civic, cultural, and recreational values to incorporate active and passive recreational uses, multi-use facilities, public spaces, and other design elements that integrate the Project into the fabric of the community to the extent practicable with the available funding.

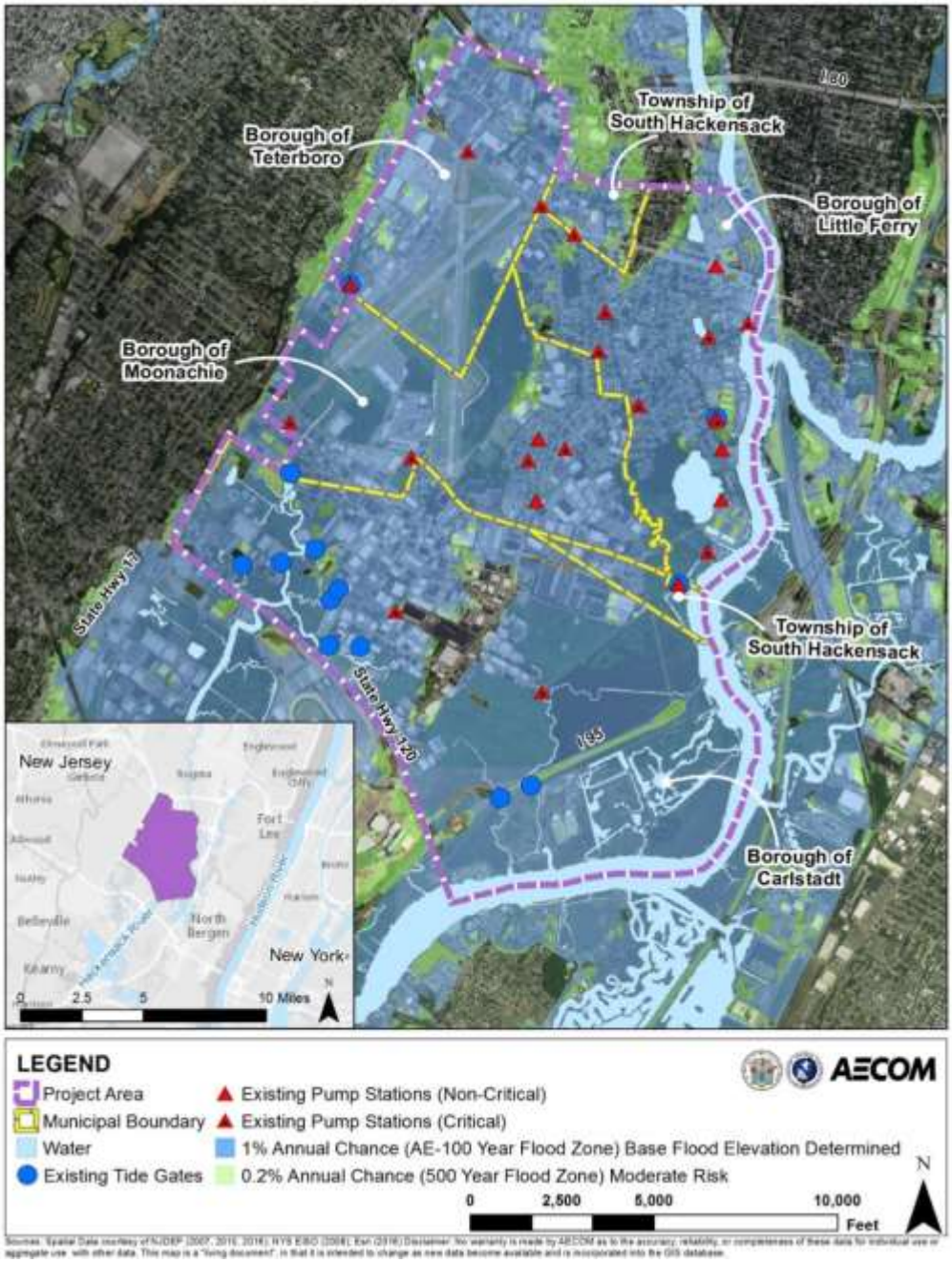


Figure 2: Project Area within the 100-Year and 500-Year Floodplains

2.1.3 Key Goals and Objectives

The Project is an urban water management strategy designed to reduce the risk of floods from coastal storm surges and/or systemic inland flooding from large rainfall events within the Project Area, thereby protecting public health, public safety, and property. The ability to meet this purpose will be measured in terms of the following Project goals and objectives:

Goal: Contribute to Community Resiliency. The Proposed Project would integrate a flood hazard risk reduction strategy with existing and proposed land uses and assets. The Proposed Project would reduce flood risks within the Project Area, leading to improved resiliency and the protection of accessibility and on-going operations of services (including protecting critical infrastructure such as hospitals, fire stations, and police department buildings; and roadways and transit resources). This would allow these key assets to support emergency preparedness and community resiliency during and after flood events.

Goal: Reduce Risks to Public Health. In addition to providing protection to critical healthcare infrastructure (such as local hospitals and emergency services), the flood risk reduction strategy would reduce the adverse health impacts associated with these types of flood events, such as the spread of infectious diseases, compromised personal hygiene, and contaminated water sources.

Goal: Contribute to On-going Community Efforts to Reduce FEMA Flood Insurance Rates. The NFIP's Community Rating System allows municipalities to reduce their flood insurance rates through implementation of comprehensive floodplain management. The Project would include concepts and alternatives that are consistent with the local municipalities' overall effort to reduce FEMA Flood Insurance Rates.

Goal: Deliver Co-Benefits. Where possible, the Project would integrate the flood hazard risk reduction strategy with civic, cultural, ecological, and recreational values. The Project would strive to incorporate active and passive recreational uses, multi-use facilities, and other design elements that integrate the Project into the fabric of the community. In this way, the Project would be independent of, but would complement, local strategies for future growth, to the extent possible.

Goal: Enhance and Improve Use of Public Space. The Project would strive to reduce risks to private and public property from flood impacts while also incorporating design elements that improve public and recreational spaces, thereby enhancing quality of life for the community.

Goal: Consider Impacts from Sea Level Rise. The Project would consider the projected impacts from sea level rise and its impacts on the frequency and degree of flooding.

***Goal: Protect Ecological Resources*.** The Project would strive to protect and enhance ecological resources by protecting wetlands and other habitats that contribute to regional biodiversity and ecosystem resiliency.

Goal: Improve Water Quality. The Project may incorporate green infrastructure solutions into the design and construction of proposed flood risk reduction measures to manage stormwater runoff, reduce stormwater pollution, and improve water quality.

2.2 RBD Meadowlands Project Description

2.2.1 Original RBD Meadowlands Concept

As originally proposed during the HUD RBD competition, the Meadowlands concept envisioned creating a system of natural areas, berms, and additional wetlands to reduce flooding risks. The original concept also articulated an integrated vision for protecting, connecting, and growing the Meadowlands District, as a critical asset, to both the rest of New Jersey and the metropolitan area of New York. By integrating transportation, ecology, and development, the awarded concept sought to transform the Meadowlands basin to address a wide spectrum of risks, while providing potential civic amenities and creating opportunities for new redevelopment.

The original RBD Meadowlands concept was divided into three pilot areas. As described above in **Section 1.1**, HUD awarded $150 million in CDBG-DR funds to the State of New Jersey for the Project, specifically for the "Phase 1 Pilot Area." The Phase 1 Pilot Area is now referred to as the RBD Meadowlands Project Area, as shown in **Figure 3**. While additional pilot areas or phases were identified for the overall Meadowlands Program Area during the RBD competition, there is no plan to fund the Phase 2 and Phase 3 Pilot Areas at this time.

The original RBD Meadowlands concept took a multi-faceted approach intended to address flooding from both major storm surges and high tides, as well as from heavy rainfall events, with several potential ancillary benefits. The concept's comprehensive approach to resilience consisted of three integrated components for each Pilot Area: "Protect, Connect, and Grow." **Protect** would provide flood protection; **Connect** would increase modal connectivity among the towns and surrounding areas; and **Grow** would continue flood improvement goals through rezoning opportunities. The original concept as envisioned would cost approximately $850M.

2.2.2 Moving from the Original, Broad Concept to a More Focused Concept

Based on the amount of CDBG-DR funding (i.e., $150M) provided by HUD, NJDEP has determined that the Project, in application, will focus primarily on reducing flood risk within the Project Area (i.e., the "Protect" component of the "Protect, Connect, Grow" concept). Potential ancillary "Connect" and "Grow" components of the original concept, while not funded specifically at this point, could be logical and reasonable future outcomes following implementation of the critical "Protect" function if additional funding becomes available.

Early in the planning process, and as codified in the Public Scoping Document for the Environmental Impact Statement (EIS) in February 2016 (see **Section 2.2.3**), NJDEP identified three broad alternatives that included the following:

- **Alternative 1 (Structural Flood Reduction):** This alternative would analyze various structural, infrastructure-based solutions that would be constructed to provide protection from both inland and tidal/storm surge flooding. This alternative, to the extent practical, would evaluate a FEMA certifiable level of flood protection to a portion of the Project Area. This alternative would consist of a range of structures, including levees, berms, barriers, drainage structures, pump stations, floodgates, and/or other hard and soft infrastructure to achieve the required level of flood protection.

- **Alternative 2 (Stormwater Drainage Improvements):** This alternative would analyze a series of stormwater drainage projects aimed at reducing the occurrence of higher frequency, small- to medium-scale flooding events that impact the communities located in the Project Area. Together, these interventions would provide a system of improved stormwater management, and may include both local drainage improvements and wetlands restoration to protect communities located in the Project Area and address day-to-day water management challenges. These interventions may include: drainage ditches, pipes, and pump stations at strategic locations; increased roadway elevations; new green infrastructure (e.g., wetland drainage basins, bioswales, rain gardens), water storage areas, and water control structures; cleaning and de-snagging of existing waterways; and increasing and enhancing public open space.

- **Alternative 3 (Hybrid of Alternative 1 and Alternative 2):** This alternative would analyze a strategic, synergistic blend of new infrastructure and local drainage improvements to reduce flood risk in the Project Area. Components of Alternatives 1 and 2 would be combined to provide an integrated, hybrid solution that employs a combination of appropriate levees, berms, drainage structures, pump stations, and/or floodgates,

coupled with local drainage improvement projects, to achieve the maximum amount of flood protection within the boundaries of the Project Area.

As further identified in the Final Public Scoping Document, the ability of each considered alternative to achieve, to the maximum extent possible, the Project goals and objectives as described in **Section 2.1.3** would be evaluated. **Figure 3** illustrates the progression from the original Meadowlands concept to the current state of alternatives' development, as discussed further below.

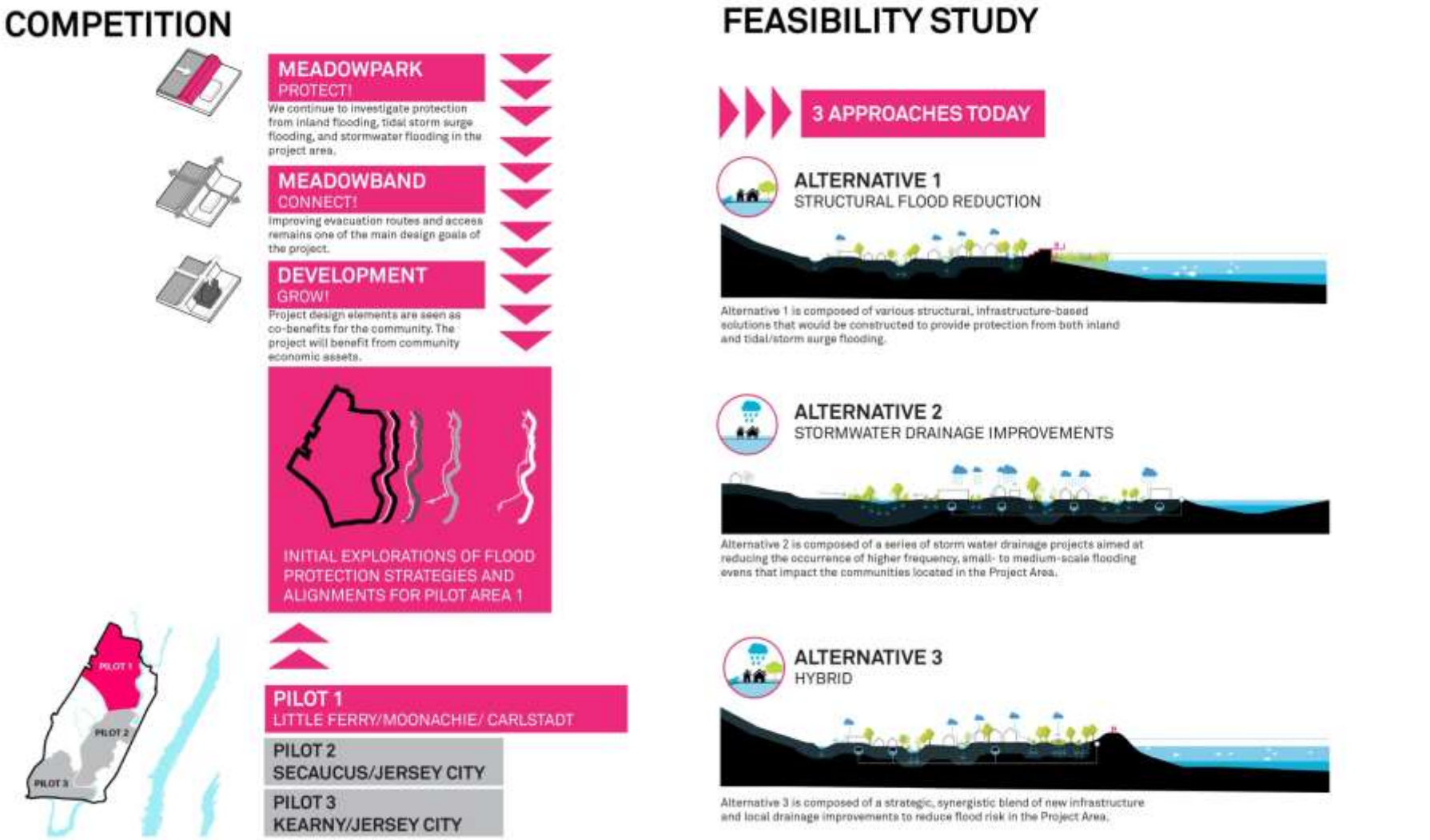


Figure 3: RBD Meadowlands Pilot Phase 1 Approach to Developing the Alternatives

2.2.3 Developing Flood Risk Reduction Concepts

As this Project is federally funded and constitutes a "major Federal action significantly affecting the quality of the human environment," the Project must comply with the National Environmental Policy Act (NEPA), and an EIS must be prepared.

The NJDEP is currently undertaking a systematic, multi-phased process of analyzing component pieces of each broad alternative to identify and ultimately assemble a clearly defined, feasible set of three well-defined Build Alternatives that is further evaluated in the DEIS. These alternatives are being developed through the Alternatives Development and Screening process initially described in the Final Public Scoping Document dated August 17, 2016 (www.rbd-meadowlands.nj.gov). The goal of this concept development and screening process is to assemble final Build Alternatives that maximize the benefits to the Project Area while minimizing overall costs and adverse environmental effects.

2.2.3.1 Overview of Concept Development Process

The alternatives concept development process involves the identification of flooding sources, identification of locations subject to frequent flooding, quantification of the flooding hazards through modeling, and the crafting of potential flood risk reduction measures and concepts specific to each alternative within the Project Area.

Once these concepts are developed, analyzed, and screened to a manageable number, NJDEP will complete an engineering Feasibility Study on the final concepts to develop the three Build Alternatives.

The Feasibility Study will include details of the several site-specific surveys that have been conducted in support of the Project, including identifying the locations of existing infrastructure, such as parks, roadways, transit systems, stormwater drainage systems, utilities, and foundation structures for various other types of infrastructure. The Feasibility Study will also include details regarding the coastal and inland flooding models that are being developed to evaluate the effectiveness of various flood risk reduction concepts.

To maximize potential flood risk reduction benefits, NJDEP is developing and analyzing concepts that are considering existing infrastructure and environmental constraints. As part of this analysis, NJDEP is examining the potential interaction between existing conditions and the performance of new flood risk reduction concepts, in the context of both applicable regulatory standards and the local characteristics of the Project Area.

2.2.3.2 Overview of Concept Screening Process

Concurrent with the early stages of alternative concept development, NJDEP developed an initial Screening Criteria Matrix (found here: http://www.rbd-meadowlands.nj.gov) to assist with the refinement and evaluation (i.e., screening) of the various concepts considered, leading to the development of the final three Build Alternatives.

Developed by analyzing the goals and objectives of the Project, as well as existing environmental resource areas of concern within the Project Area, this Screening Criteria Matrix included an array of criteria used to measure and compare the various concepts could be measured and compared. These criteria were grouped into the following categories:

- Flood Risk Reduction
- Built Environment/Human Environment
- Construction/Operations and Maintenance
- Natural Environment
- Costs and Benefits.

Individual screening criteria in the matrix were established based on the Project's purpose and need, goals and objectives, potential impacts to the natural environment and the community, and the Project's overall feasibility. Examples of screening criteria included were:

- Performance criteria (such as flood risk reduction effectiveness)
- Environmental constraints (including but not limited to cultural resources, hazardous waste, and environmental justice)
- Community interests (such as access to the Hackensack River)
- Feasibility factors (such as constructability and construction cost).

The matrix identified initial, broad levels of potential impact for each criterion by applying a Good-Fair-Poor-Fatal Flaw ranking and using both quantitative and qualitative metrics, as appropriate. As part of its development, the Screening Criteria Matrix was presented to the Citizens Advisory Group (CAG) for comment and input. The matrix was subsequently revised to incorporate CAG comments.

The Screening Criteria Matrix is being used to compare the various concepts developed for each alternative as the concept development process progresses. Those concepts which least satisfied the Project's purpose and need, as represented in the Screening Criteria Matrix, were eliminated from further consideration, while those that best satisfied the purpose and need were advanced and further developed.

2.2.3.3 Alternatives to be Analyzed in the DEIS

During the final screening phase, the structural flood reduction (Alternative 1), stormwater drainage improvements (Alternative 2), and hybrid (Alternative 3) concepts that best fulfill the purpose of and need for the Project will be advanced as the Project's Build Alternatives, and subjected to further scrutiny through the Feasibility Study to more fully develop, refine, and describe each alternative. Once sufficiently analyzed through feasibility, these Build Alternatives will be subjected to full analysis within the DEIS. NJDEP will be conducting the Feasibility Study and EIS analysis concurrently.

The analysis presented in the DEIS will consist of a comparison of the four alternatives' impacts (i.e., including the three Build Alternatives and the No Action Alternative) on the physical, natural, cultural, and socioeconomic environment pursuant to 24 CFR Part 58, as well as how well each alternative meets the purpose of and need for the Project. In accordance with 40 CFR § 1502.14(d), NJDEP is fully analyzing the No Action Alternative in the DEIS.

The following sections describe the development history of the concepts associated with each Build Alternative. As noted below, concepts have become increasingly focused and defined through an increasingly rigorous screening process at each stage. Through this process, NJDEP will identify the most effective and comprehensive strategy possible within the available funding limits.

2.2.4 Alternative 1: Structural Flood Reduction - Concept Development and Screening

The Alternative 1 concept that is being developed would implement a line of protection around the Project Area that would guard against flooding from the Hackensack River and Berry's Creek. Such flooding results from coastal storm surges and high tides as well as overflow of inland ditches and channels associated therewith. This line of protection would consist of both earthen structures (i.e., berms and levees) and engineered structures (i.e., floodwalls), with integrated public realm and ecological benefit components, as appropriate. Public realm components, such as planters, benches, and viewing platforms, would be integrated into the alignment where site constraints drive the need for a smaller footprint. In other cases, there may be room to create larger public realm opportunities, such as parks and public gathering areas.

Alternative 1 began with the development and initial review of five broad structural flood reduction concepts. These broad concepts were created to capture a range of possible levels of protection over varying project areas in order to maximize the number of potential options carried forward following the initial screening phase.

These broad concepts were as follows:

- **Option 1 – 100-year Storm Protection/Expanded Project Area:** This concept would create a structural line of protection constructed along the Hackensack River to a height of 12.6 feet above sea level (NAVD 88) to protect the area extending south from I-80 to State Route 3. This height would be sufficient to provide a FEMA-certified level of protection against the 100-year flood event.

- **Option 2 – 100-year Storm Protection/Project Area:** This concept was similar to Option 1, except that it would protect the area extending south from the northern boundary of Little Ferry to Paterson Plank Road (State Route 120). This concept would still provide a FEMA-certified level of protection against the 100-year flood event.

- **Option 3 – Reduced Level of Protection/Project Area:** Under this concept, structural design elements would be constructed to tie into the existing 7-foot above sea level (NAVD 88) contour in the Project Area. A line of protection at a height of 7 feet above sea level would be sufficient to provide protection to approximately the 45-year event (present day), and to approximately the 10-year event in 50 years based on sea level rise projections.

  The reason for the decrease in the level of protection from 12.6 feet to 7 feet above sea level (NAVD 88) in this concept is due to public safety concerns. Any constructed line of protection that is less than the FEMA-certified level of protection against the 100-year flood (12.6 feet) must account for the possibility of overtopping during the 100-year flood event, which would lead to a bathtub effect similar to, but significantly more severe than, that experienced in the Project Area during Superstorm Sandy. In this scenario, floodwaters would pour over the line of protection and into the Project Area, filling it rapidly. Residents would have limited opportunity to evacuate once the overtopping occurred; more importantly, depending on the height of the level of protection, the water depth could be at a level that would present a significant risk of drowning. Additionally, following the flood, the time during which the floodwaters remain in the protected area would be prolonged (proportionate to the height of the level of protection), as the floodwaters would be retained by the line of protection instead of retreating with the tide.

  Based on the average elevations within the Project Area, overtopping of a 7-foot line of protection would lead to a lesser bathtub effect than, for example, a 10-foot line of protection, which would pose a significantly higher threat to human life. Overtopping of a 7-foot line of protection would lead to Project

Area conditions that would result in minimal potential for loss of life due to drowning; levels of protection between 7 feet and 12.6 feet above sea level (NAVD 88) would result in overtopping that would result in unacceptable potential loss of life due to drowning during such conditions.

- **Option 4 – Ring Levees/Reduced Project Area:** This concept would use structural design elements to construct a FEMA-certified level of protection against the 100-year flood for small, select areas within the Project Area. As there are a very limited number of points within the Project Area that exceed 12.6 feet above sea level (NAVD 88), this level of protection would have taken the form of berms and/or walls constructed in a circle around areas which HUD identified as priority for protection (i.e., low- and moderate-income [LMI] areas).

- **Option 5 – Storm Surge Barrier on Hackensack River:** This alternative included the construction of a large storm surge barrier across the Hackensack River near Portal Bridge, which would have provided coastal storm surge protection for the entire 100-year floodplain north of that location.

During the initial screening stage, these five broad concepts were screened for feasibility. This screening process included determining which of these broad concepts were reasonable and feasible within the Project's core, non-negotiable baseline requirements: (1) the Project must be constructed to a fully operational level within the original budget of $150 million received from HUD in the CDBG-DR grant; (2) the Project must not increase the threat of flooding elsewhere (i.e., the Project cannot construct flood protection measures that may induce additional flooding elsewhere); and (3) the Project must seek to maximize the ratio of added benefits to incurred costs, as detailed in the Benefit-Cost Analysis (BCA) (i.e., ratio >1).

The results of the screening are summarized below in **Table 1**. In summary, Options 1, 2, 4, and 5 were eliminated from further consideration due to the potential to induce flooding elsewhere, unacceptably low BCA ratio (i.e., ratio <1), or greatly exceeding available funding. Option 3 was determined to be the only feasible concept and was advanced to the second stage of development.

Table 1: Initial Screening of Alternative 1

Concept	Screening Metrics			Concept Advanced to Phase II of Development?
	Cost Within Budget	Poses No Increased Flooding Risk	Benefit to Cost Ratio > 1	
Option 1: 100-year Storm Protection/Expanded Project Area	×	✓	✓	No
Option 2: 100-year Storm Protection/Project Area	×	✓	✓	No
Option 3: Reduced Level of Protection/Project Area	✓	✓	✓	**Yes**
Option 4: Ring Levees/Reduced Project Area	✓	✓	×	No
Option 5: Storm Surge Barrier on Hackensack River	×	×	✓	No

Green = Concept passes metric; Red = Concept fails metric.

NJDEP identified several possible alignments of Alternative 1 for the 7-foot line of protection, identified as Option 3. The overall strategy for creating potential alignments for the 7-foot line of protection that would be needed to connect it into a comprehensive line of protection for the Project Area were to: (1) maximize use of available high ground (i.e., at the 7-foot or higher contour), so as to decrease the amount of new infrastructure required and minimize costs and potential impacts; (2) remain as close as possible to the Hackensack River/Berry's Creek, so as to maximize the amount of Project Area protected; and (3) maximize the use of existing public land and green spaces, so as to avoid private land ownership conflicts, minimize the costs for land acquisition, and create opportunities for ecological and recreational improvement. The alignments under consideration may extend to the north or south of the Project Area to tie-in to existing high ground. This is the subject of ongoing screening of the components of Alternative 1, and will be evaluated and addressed in the DEIS.

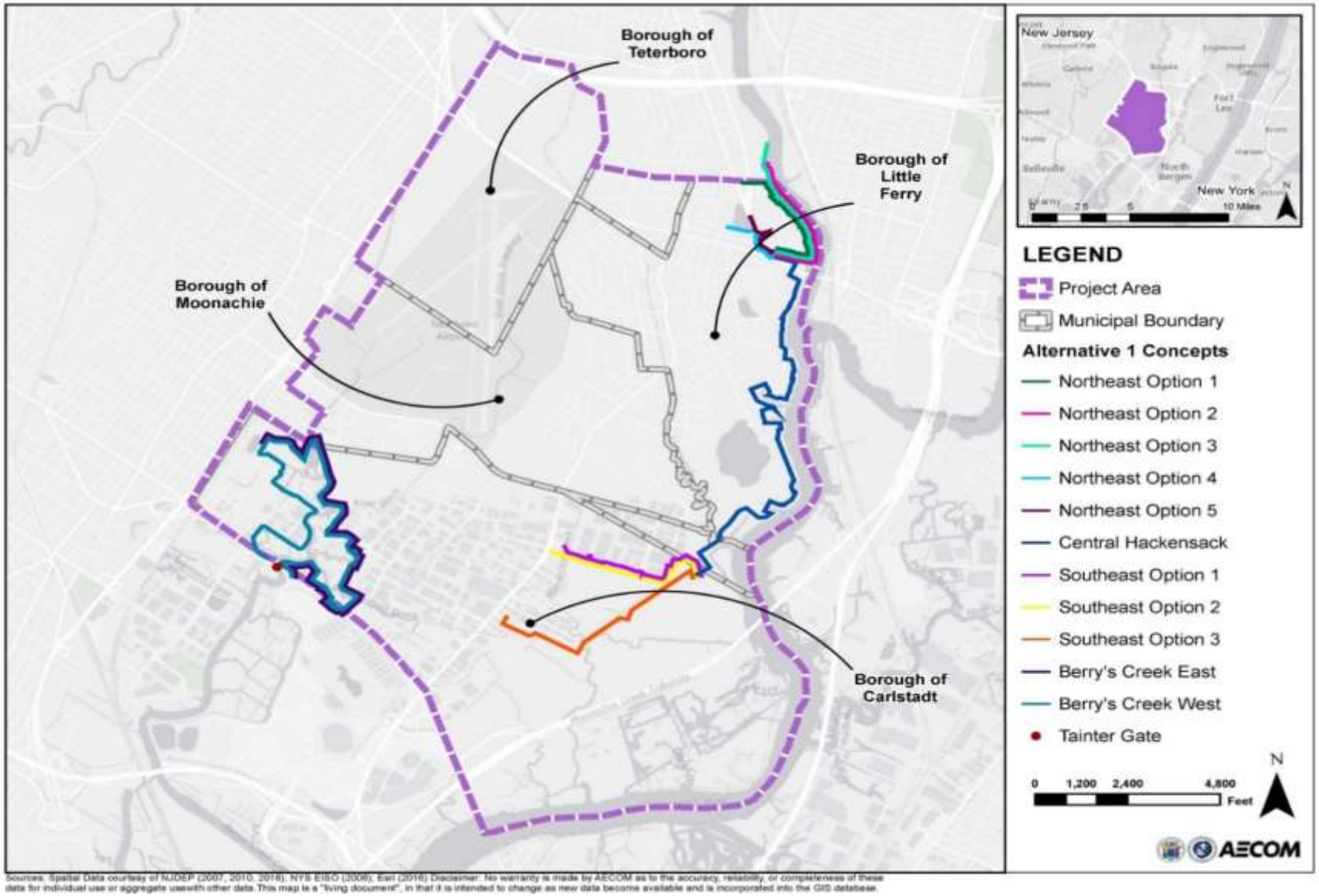
As displayed on **Figure 4**, a total of 12 potential alignments were developed. These potential alignments are identified as the Northern Tie-in Alignments (Northeast Options 1 through 5), Central Hackensack, Southern Tie-in alignments (Southeast Options 1 through 3), and the Western alignments and/or methods (Berry's Creek East, Berry's Creek West, and Tainter Gate).

Additionally, NJDEP developed a "kit of parts" consisting of various types of floodwalls and berms (e.g., basic sheet pile floodwalls; cantilever walkway floodwalls; floodwalls with built-in amenities like benches, planters, or canopies; basic berms; and planted berms with paths). Using these components, NJDEP assembled a comprehensive line of protection that best complemented the different land uses within the Project Area (i.e., residential, commercial, and industrial). **Appendix A** provides an overview of the "kit of parts" being considered under Alternative 1.

Once each concept for the 7-foot line of protection (elevation 7 NAVD 88) was sufficiently developed, each alignment was subjected to additional screening. The screening concentrated on the following screening metrics that were analyzed by subject matter experts within each technical resource area:

- Effectiveness at achieving flood risk reduction within the Project Area
- Potential to maximize the BCA ratio;
- Ability to implement before September 2022 in accordance with the terms of the HUD funding
- Potential to adversely affect specific resources as identified in the Screening Criteria Matrix, with emphasis on known National Priorities List (NPL) sites or other hazards and hazardous materials sites, wetlands/water resources, transportation and existing evacuation routes, and biological resources
- Potential to require land acquisition from private landowners
- Potential need to incorporate mitigation actions into overall design
- Ability to implement within the $150 million budget.

This screening process is still in progress. Concept drawings for each of the alignment options undergoing additional analysis are provided in **Appendix A**. The NJDEP evaluation and screening process will lead to a fully developed Alternative 1 that can be compared against the other alternatives in order to select a Preferred Alternative in the Fall of 2017.



Sources: Spatial Data courtesy of NJDEP (2007, 2010, 2016); NYS EISO (2006); Esri (2016) Disclaimer: No warranty is made by AECOM as to the accuracy, reliability, or completeness of these data for individual use or aggregate usewith other data.This map is a "living document", in that it is intended to change as new data become available and is incorporated into the GIS database.

Figure 4: Potential Alternative 1 Alignments

2.2.5 Alternative 2: Stormwater Drainage Improvements - Concept Development and Screening

The Alternative 2 concept that is currently being developed would reduce flooding in the Project Area that results from under-performing stormwater drainage infrastructure. This would be accomplished through a combination of both grey and green infrastructure. Grey infrastructure typically refers to built infrastructure, such as stormwater sewers or pumping stations. Green infrastructure refers to environmental solutions designed to reduce and treat stormwater at its source, while also providing potential social, environmental, or economic benefits. This alternative may also include new public spaces that create stormwater management opportunities.

The development of Alternative 2 (Stormwater Drainage Improvements) began with a detailed examination of possible opportunities within the Project Area to improve stormwater drainage. To frame and manage this effort, the Project Area was initially divided into 20 distinct drainage sub-basins based on existing local hydrology and drainage, as well as initial stormwater modeling. The NJDEP then compiled information for each sub-basin from a review of existing data, site-specific field investigations and surveys, and interactive meetings with the CAG and local officials to identify specific areas prone to flooding and in need of stormwater drainage improvements.

By using both the information collected regarding known problem areas and the drainage sub-basin models, NJDEP developed a total of 30 initial stormwater drainage improvement concepts. These concepts included the use of grey and/or green infrastructure, including the elements displayed in **Table 2**.

Table 2: Grey and Green Infrastructure Features Considered for Alternative 2

Grey Infrastructure Features	Green Infrastructure Features
New, Improved, or Relocated Pump Stations	New or Improved Open Space
Backflow Preventers	Permeable Paving
Channel Improvements (Including Habitat Restoration)	Rain Gardens and Bioretention Cells
Berms around Ditches/Ponds	Bioswales
Force Mains	Wetland Improvements
Settling Basins/Forebays	Bump Outs
Off-channel Storage	Median Plantings

The 30 initial concepts concentrated on improving both stormwater collection and conveyance in 11 general locations within the Project Area. **Appendix B** provides an overview of the concepts as categorized by each of these 11 general locations, including the approximate boundaries of each general location (i.e., concept area) and potential key features.

To conduct the initial screening, the NJDEP tailored the Screening Criteria Matrix specifically to address and analyze stormwater drainage improvement opportunities. The following elements were considered during the screening of Alternative 2 concepts:

- Effectiveness at achieving improvements to stormwater drainage in the Project Area
- Potential to result in adverse effects to LMI communities, hazards and hazardous materials sites, biological resources, water resources, and/or evacuation routes
- Potential to result in adverse impacts to the built and human environment, including access to the waterfront; recreational, civic, and cultural amenities; viewsheds and visual quality; and housing.

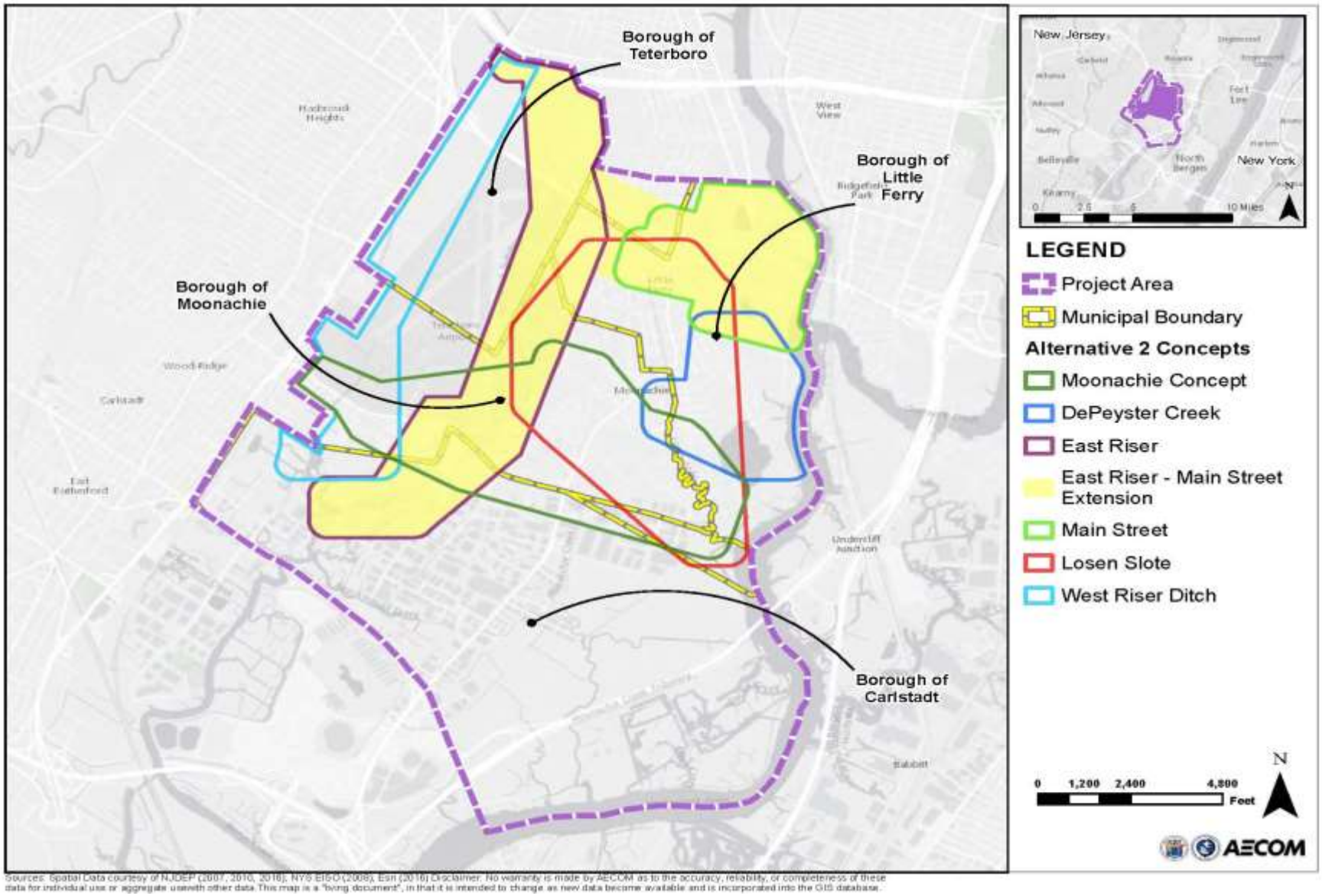
Based on the comparison of the initial concepts using the screening matrix, the NJDEP was able to eliminate, revise, and/or combine concepts, resulting in the prioritization of the seven best concepts that were advanced for further screening. For example, two concepts, one in the Gotham Parkway area and one in the Lower East Riser Ditch area, were eliminated due to fatal flaws (i.e., potential impacts to existing hazards and hazardous materials sites, the ongoing remediation of Berry's Creek, and/or potential to increase transport of existing contaminants).

These seven concepts, as shown in **Figure 5**, were then advanced and presented to the CAG at CAG Meeting #7 on January 31, 2017. The presentation from that meeting is available on the Project website at www.rbd-meadowlands.nj.gov. These seven concepts are depicted in more detail in **Appendix B** and described generally below:

- **Drainage Improvement Concept 1: Main Street** – Green street improvements, including bump outs, median plantings, rain gardens and bioswales; Open space improvements such as new berms; New open space parks with stormwater collection and filtration capacity; Grey drainage infrastructure and improvements to pump stations.
- **Drainage Improvement Concept 2: DePeyster Creek** – Improved stormwater collection and filtration with bioswales. New public open space; Increased channel conveyance through berming, grading, and improved pump stations.
- **Drainage Improvement Concept 3: Moonachie** – Green street improvements, Channel and riparian improvements; Open space and drainage improvements, and new public open space.
- **Drainage Improvement Concept 4: Losen Slote Creek** – Green street improvements such as bioswales, and permeable paving; Open space improved; New public open space; Channel improvements (including

dredging), two new pump stations, and a force main; Wetland improvements to improve stormwater storage.

- **Drainage Improvement Concept 5: All West Riser Ditch** – Channel improvements and berms; New pump stations and improvements to pump station; Median plantings.
- **Drainage Improvement Concept 6: All East Riser Ditch** – Channel improvements; New pump stations; New open space.
- **Drainage Improvement Concept 7: All East Riser + Main Street with Diversion** – Combination of Concepts 1 and 6 with a new pump station.



Sources: Spatial Data courtesy of NJDEP (2007, 2010, 2016); NYS ETSO (2008); Esri (2016) Disclaimer: No warranty is made by AECOM as to the accuracy, reliability, or completeness of these data for individual use or aggregate usewith other data. This map is a "living document", in that it is intended to change as new data become available and is incorporated into the GIS database.

Figure 5: Seven Potential Alternative 2 Concepts

The seven concepts were then subjected to a subsequent, more rigorous screening analysis. The primary screening criteria applied during this phase of analysis included the following:

- Effectiveness at achieving flood risk reduction within the Project Area/ potential to maximize the ratio of added benefits to incurred costs
- Ability to implement within the $150 million budget
- Ability to construct before September 2022 in accordance with the terms of the HUD funding
- Potential to result in adverse effects to specific resources, with particular emphasis on hazardous waste sites, biological resources, and recreational resources
- Potential need to incorporate mitigation actions into the overall design.

The general locations of these seven concepts are displayed in Figure 6. The final screening process is currently in progress. As the NJDEP evaluation process continues, these concepts will be carried through in the Feasibility analysis to lead to a fully developed Alternative 2 that can be compared against the other alternatives in order to select a preferred alternative by Fall of 2017.

2.2.6 Alternative 3: Hybrid of Alternatives 1 and 2

The Alternative 3 concept that is being developed would implement comprehensive flood risk reduction in the Project Area, including both a structural line of protection and targeted stormwater drainage improvements. This alternative would, therefore, consist of an appropriate combination of the elements described in Alternatives 1 and 2, above. **Figure 6** identifies the process that is being undertaken to develop Alternative 3.

2.2.7 No Action Alternative

In accordance with 40 CFR § 1502.14(d), NJDEP is fully analyzing the No Action Alternative in the DEIS. The No Action Alternative provides a baseline of anticipated future conditions without implementation of the Project, thereby allowing a comparative analysis of the potential effects of the Build Alternatives with that future baseline.

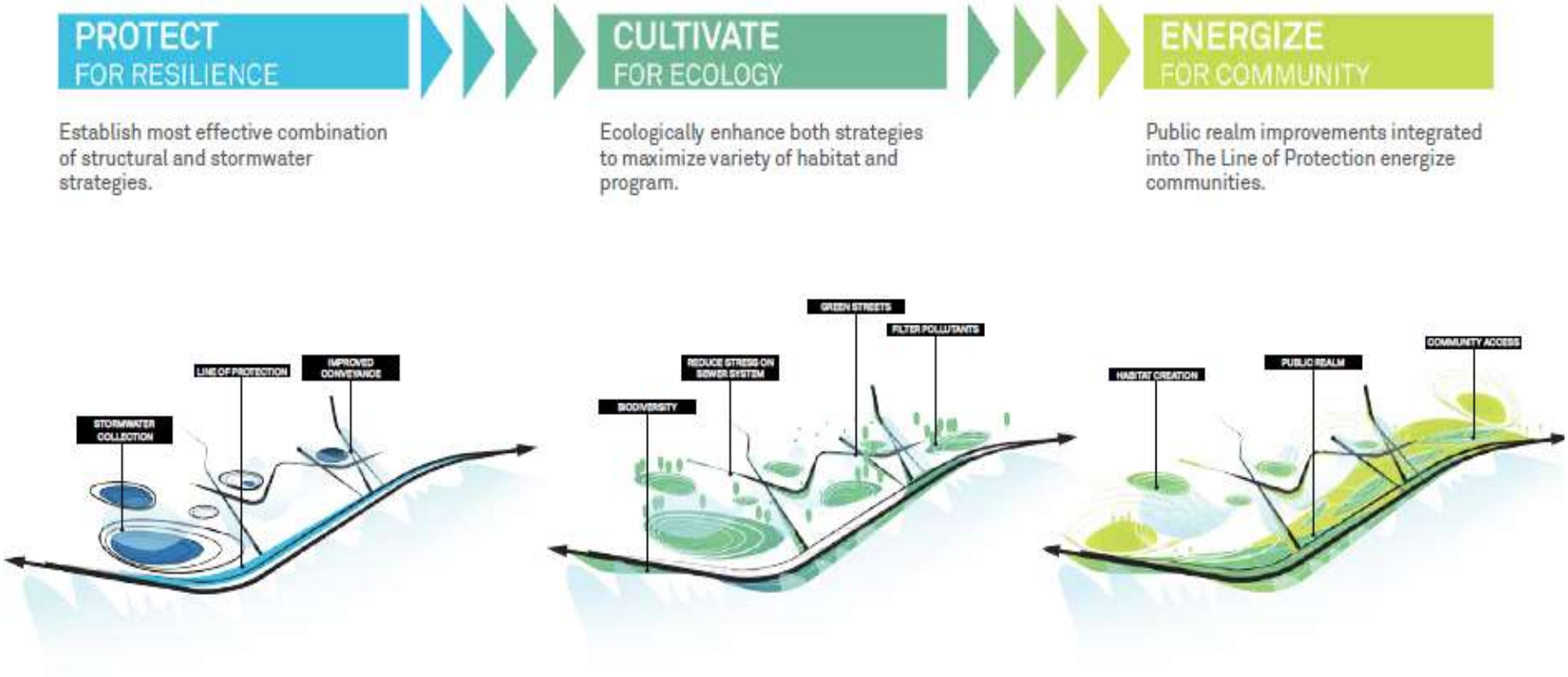


Figure 6: Alternative 3 Development Process

2.3 RBD Meadowlands Project Funding

2.3.1 Timeline and Budget

The preliminary estimated timeline and budget for the Project are shown in **Table 3**.

Table 3: RBD Meadowlands Project
Estimated Timeline and Budget (*in $ millions*)

Project Phase	2015	2016	2017	2018	2019	2020	2021	2022	Total
Planning & Feasibility	$1	$5	$14	$4					**$24**
Design & Predevelopment				$10	$7				**$17**
Site Development & Construction					$8	$25	$39	$37	**$109**
Total	**$1**	**$5**	**$14**	**$14**	**$15**	**$25**	**$39**	**$37**	**$150**

2.3.2 Allocation for Activity

The allocation for this activity is $150,000,000 of HUD CDBG-DR funds. Per HUD guidelines, up to 5% of the allocation ($7.5 million) may be utilized for administrative costs.

2.3.3 Eligibility for CDBG-DR Funding

The Project's eligibility for CDBG-DR funding is per Notice FR-5696-N-11(VII)(b) (Rebuild by Design).

2.3.4 Project Coordination and Compliance

Once a Preferred Alternative is recommended, the NJDEP will be identifying partnerships and any leveraged or reasonable anticipated funds that will could be used for components of the RBD Project in a subsequent APA, as required in Section VI of Federal Register Notice FR-5696-N-11. At this point in the decision-making process, no agreements have been executed or have been identified as being needed with Project partners.

Additionally, in the permitting and design phases of the Project, the Project may trigger local zoning and land use regulations that fall within the municipal purview.

NJDCA has certified that the preliminary design will consider the appropriate code, industrial design standards, and construction standards, and that a registered Professional Engineer (PE) will certify that the final design meets all relevant codes. Additional consultation will be needed to identify the necessary permits once a Preferred Alternative is selected. These consultations include, but are not limited to:

- Section 7 consultation under the Endangered Species Act
- Section 401/404 permits under the Clean Water Act
- Section 10 under the Rivers and Harbors Act
- Coastal Zone Consistency Statement under the Coastal Zone Management Act
- Section 106 consultation under the National Historic Preservation Act with the State Historic Preservation Officer under the National Historic Preservation Act.

The Project is also addressing the long-term efficacy and fiscal sustainability, outlined in Section VI(2)(g)(4) of the November 2013 Federal Register Notice (FR-5696-N-06). An O&M plan for the Project will be prepared describing the procedures and responsibilities for routine maintenance, communication and timing of activation in the event of an impending storm condition. NJDEP will form an O&M subcommittee with local and State partners that will develop an O&M management strategy framework for the Project. The participants in the O&M planning and development will be identified once a Preferred Alternative is identified for the Project. The O&M Plan management will be a critical component of the overall Project and will contain five very distinct functions: Operations, Maintenance, Engineering, Training, and Administration. Once estimated costs for O&M are developed for the Preferred Alternative, NJDCA will certify in accordance with Federal Register FR-5696-N-11 VI.6.b that the long term O&M costs for the RBD Meadowlands Project will be adequately funded from reasonably anticipated revenue provided by State and local partners.

The NJDEP has also taken steps to meet the resilience performance standards requirements identified in Section VI(2)(e) of the November 2013 Federal Register Notice (FR-5696-N-06). Through the NJDEP Flood Hazard Area Control Act (FHACA) (N.J.S.A. 58:16A-50 et seq.) and implementing Rules (N.J.A.C. 7:13), the State has taken steps to reduce the damage and risks to public safety and health and the environment caused by flooding while assuring the creation of a more resilient coastal community. These steps included incorporating the amendments issued in 2007 and 2013 to the FHACA Rules into the Project design:

Amendments issued in 2007 include:

- Regulation of all commercial, residential, industrial, and public development within the flood hazard area design flood, which is the 100-year (1 percent) flood plus a 25 percent factor-of-safety to account for potential future increases in flood discharges in fluvial areas;
- Restrictions on the loss of any flood storage volume within the flood hazard area of fluvial surface waters, which ensures continued protection from anticipated flood events of increasing intensity;
- Establishment of protected riparian zones around all regulated surface waters, which limit the removal of vegetation, thereby increasing water quality protection, reducing erosion, and preserving flood storage along these waters, all of which ensures continued protection from anticipated flood events of increasing intensity; and
- The requirement that the lowest floor of buildings and the travel surface of roadways and parking areas be situated at least one foot above the flood hazard area design flood elevation to account for the possibility of impacts from future flood events that may be greater than the predicted levels.

Emergency amendments in 2013 were issued to facilitate rebuilding after Superstorm Sandy in a more resilient manner by:

- Ensuring that the best available flood elevation data is used to determine the flood hazard area design flood elevation for a given site, including FEMA's advisory flood maps and subsequently released preliminary maps for New Jersey's coast, which include revised A and V-Zone limits, as well as FEMA mapping issued as final (effective) that is developed in partnership with the NJDEP and depict the NJDEP's flood hazard area design flood elevation and floodway limit;
- Allowing flood proofing measures to be used instead of elevating buildings in certain, limited situations where elevating is not feasible or cost-effective; and
- Ensuring consistency between the NJDEP's standards for elevating buildings in flood hazard areas with the building standards of the Uniform Construction Code promulgated by the Department of Community Affairs at N.J.A.C. 5:23.

The flood mapping used by the State prior to this rulemaking was outdated and generally underestimated the actual 100-year flood elevation by approximately 1 to 4 feet and, in some circumstances, by as much as 8 feet. This was illustrated during Superstorm Sandy, when many people who had constructed a building with its lowest floor at the 100-year flood elevation shown on FEMA's effective Flood Insurance Rate Maps discovered that the portions of their building that lay below the advisory base flood elevation were subjected to severe flood damage. Had the

NJDEP not taken steps to allow for the use of the best available flood mapping, and to incorporate future FEMA mapping, residents would have been able to reconstruct their substantially damaged structures using the prior and inaccurate flood elevations, creating a potentially significant detriment to public health, safety and welfare during the next flooding event.

The FHACA Rules are not the State's sole means of protecting residents and their properties from flooding and severe weather events. Many efforts are ongoing throughout the State and in the various other NJDEP Departments to assist in the recovery from Superstorm Sandy and Hurricane Irene. For example, the NJDEP's Blue Acres Program was established for the purposes of acquiring flood-damaged or flood-prone properties from willing sellers for conservation and recreation purposes, thus removing families from harm's way while creating natural buffers against future severe weather events and returning flood carrying capacity to vital areas.

With respect to tidal areas, since 2011, the New Jersey Coastal Management Program (NJCMP) has developed two assessment tools to ensure that coastal communities have consistent and comprehensive guidance to assess their vulnerability to coastal hazards and capacity for resilience: the Coastal Community Vulnerability Assessment and Mapping Protocol and the Getting to Resilience questionnaire. Through the NJCMP, the NJDEP has developed the Resilient Coastal Communities Initiative to further develop these tools into a community-based planning program. The NJCMP has also initiated a Sustainable and Resilient Communities Grant Program to fund a comprehensive planning approach at the municipal level.

Further, the 2013 amendments to the NJDEP Coastal Zone Management Rules (N.J.A.C. 7:7E) allow for soft buffers through the establishment of living shorelines. Tidal wetlands are a major component of the coastal ecosystem that provide multiple ecosystem services, as well as a first defense against storm surge. Living shorelines are a means to assist in restoring special areas, such as wetlands, that have been lost and can be designed to adapt to changing environmental conditions.

2.3.5 National Objective for Low- to Moderate-Income (LMI) Populations

FR-5696-N-11 allows the State to "categorize the [RBD] project into multiple activities in order to distinguish and classify expenditures as benefitting [LMI] populations, as a means of meeting the overall benefit requirement." As described above, the State is currently evaluating the resultant impacts of the RBD Meadowlands Project, and therefore, is not positioned to designate what components may potentially be classified as meeting the LMI national objective. As a result, the State avails itself of the option to characterize activities within this Project as either meeting the LMI national objective or the Urgent Need national objective (or characterizing an entire project as LMI, if appropriate under HUD

regulations), at least so long as funding provided for RBD projects continues to be counted toward the State's overall LMI benefit requirement.

2.4 Managing State Agency and Partner Entities

2.4.1 NJDEP's Role and Responsibilities

The NJDEP is the state agency responsible for overseeing and implementing the RBD Meadowlands initiative. The NJDCA, as the State's Grantee for CDBG-DR funds from HUD, transfers CDBG-DR funding for RBD projects to NJDEP under a Memorandum of Understanding, and NJDEP administers those funds.

Over the course of implementing this Project, NJDEP has developed a team with expertise needed to meet the challenge. NJDEP has staff experienced in the planning, permitting, design and construction of flood risk reduction projects as well as other large construction projects including wetland enhancement, landfill closure, park development, site remediation, etc. Information about NJDEP's experience with various types of environmental issues and projects is available on its website at http://www.state.nj.us/dep/.

The Bureau of Flood Resilience within the Engineering and Construction Program of the NJDEP will be managing the day-to-day implementation of the Project. As the design phase of the RBD Meadowlands Project continues, and all the way through implementation, NJDEP will routinely assess its own staffing needs and, if additional staffing is required, will use program delivery funds to bring on resources to meet needs (subject to applicable Federal laws and regulations on the permissible use of CDBG-DR funds). The NJDEP will be ultimately responsible for monitoring and evaluating the efficacy and sustainability of the Project, as described in **Section 2.3.3**, and will add staffing or resources as required in order to perform this function in a manner compliant with Section VII(a)(iv) of FR-5696-N-11.

In addition, NJDEP worked with the NJ Department of Treasury to release a Request for Proposal (RFP) that secured an engineering team to complete feasibility, environmental impact statement, design, and construction administration services. The NJDEP, in conjunction with the Department of Treasury, has also successfully bid and awarded a contract for a Construction Management Firm (CMF). The CMF has been engaged to provide additional engineering support to the NJDEP team. The Department of Treasury will also work cooperatively with NJDEP and its partners to solicit bids for Project construction. NJDEP, Treasury, and the design contractor will oversee Project construction to ensure adherence to plans, specifications, permits and all other State and Federal requirements.

2.4.2 Other State Agency Involvement

While NJDEP will be the primary agency involved in designing and implementing the Project, it will not be the only relevant State agency. Roles of other agencies in this process include:

- **Department of Treasury/Office of State Comptroller.** NJDEP will continue to work closely with these two agencies in order to procure services and materials needed to realize the Project. The State procurement process is a necessary condition of ensuring cost reasonableness and the compliance with Federal and State law, which could add significant time to the Project.
- **NJ Sports and Exposition Authority.** NJSEA plays an important role as a stakeholder in the Project Area and is participating in the Project's Executive Steering Committee (ESC) and Citizen's Advisory Group (CAG). Ongoing coordination will be required given NJSEA's authority over development in the Meadowlands District.

2.4.3 Coordination with Partner Entities

Coordination and communication with potential partners are critical in the implementation of this Project. The RBD Meadowlands project team (project team) conducted early coordination, as described below, with the following partners: the Sandy Regional Infrastructure Resilience Coordination (SRIRC) Federal Review and Permitting (FRP) Team, Meadowlands Technical Coordination Team (TCT), Meadowlands Interagency Mitigation Advisory Committee (MIMAC), and other municipal governments and stakeholders.

- **SRIRC FRP Team:** The project team met with the SRIRC FRP Team on May 17, 2016, at FEMA's offices in Manhattan to provide the FRP with an overview of the Project's concept development process and the approach to public and stakeholder outreach. The SRIRC FRP Team members are Federal officials with responsibility for Federal review and permitting of complex Sandy infrastructure projects. The mission of this interagency team is to facilitate expeditious and efficient reviews of the most complex projects funded by the Disaster Relief Appropriations Act of 2013 through early engagement and identification of issues, studies, and overall development needs of the projects.

- **Meadowlands TCT:** The project team met with the Meadowlands TCT on September 4, 2014 for an initial Project kickoff meeting, which included background on the Project, an overview of the Project schedule, and review of Project milestones. It will be important for the project team to meet again with the Meadowlands TCT to present Project alternatives once they are identified later this year. On February 24, 2015, the RBD Meadowlands

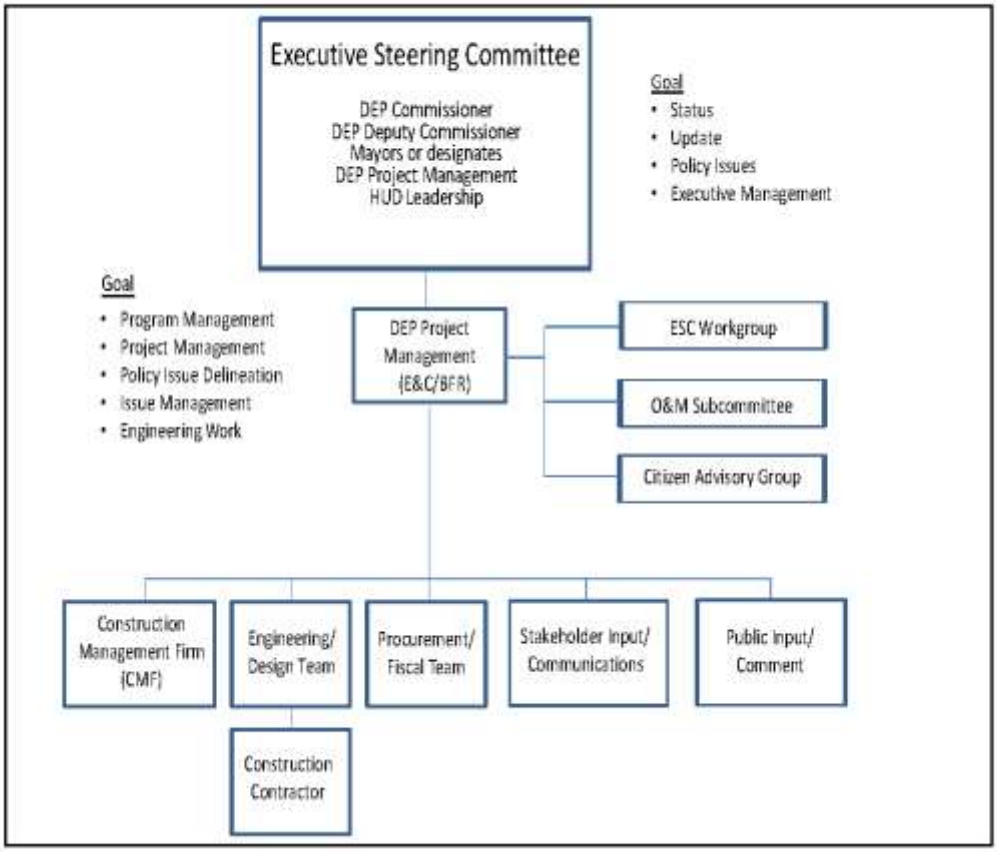
project team met for a TCT to provide a brief Project update and begin coordination with US Environmental Protection Agency (EPA) on the Berry's Creek Study Area/Superfund Site. Since this meeting, the EPA and NJDEP project teams have met regularly and at this time meet monthly to provide Project updates and coordinate efforts.

The TCT is comprised of federal, State, and local officials with subject matter expertise in resilience, planning, environmental review, and permitting in the Study Area. It was formed by the federally convened SRIRC Group and includes members from NJDEP, HUD, U.S. Army Corps of Engineers (USACE), EPA, U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS), FEMA, FTA, Federal Highway Administration (FHWA), NHSA, PANYNJ, and representatives from the local municipalities.

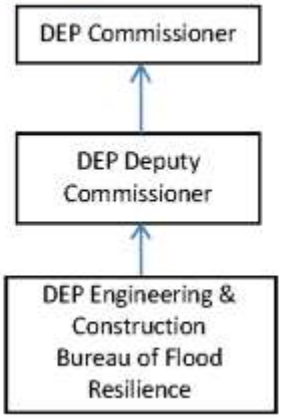
- **MIMAC:** The RBD Meadowlands project team met with the Meadowlands Interagency Mitigation Advisory Committee (MIMAC) on June 15 and December 7, 2016, to provide MIMAC with Project updates and to solicit early Project feedback from the involved agencies. MIMAC is a group of agencies that includes USACE, USEPA, NJSEA, USFWS, NMFS, and NJDEP (Land Use). MIMAC is charged with reviewing wetland mitigation proposals in the Meadowlands District. Coordination efforts with MIMAC will continue in the future as the Project alternatives are identified.

Municipal Governments and Other Stakeholders: As was proposed in APA12, municipal governments and stakeholders in the Project Area are also playing a critical role in realizing the Project and are being engaged. Section 4 describes the roles of these stakeholders related to the Citizen Outreach Plan (COP). The chart below shows the Advisory Structure and the Decision-Making Structure for the Project.

RBD Meadowlands Project Organizational Chart: Advisory Structure



RBD Meadowlands Project Organizational Chart: Decision-Making Structure*



* Advice from the Executive Steering Committees is considered by E&C/BFR and reported up to the Commissioner who has final decision-making authority. The Commissioner also chairs the Executive Steering Committees and is directly informed of the Committee's advice. E&C/BFR's role in the Advisory Structure is primarily a staffing function to facilitate the synthesis and transmission of issues and considerations to the Executive Steering Committee for input. Separate from its role in facilitating the Executive Steering Committee's advisory role, E&C/BFR also is involved in NJDEP's RBD decision-making process, which includes evaluating the input provided through the advisory structure.

SECTION 3: RBD MEADOWLANDS PERFORMANCE SCHEDULE

Table 4 summarizes the schedule for the RBD Meadowlands Project. Under the proposed schedule, the Project will proceed in a timely manner and is currently on schedule for completion of construction by September 30, 2022. However, as established by this schedule, the Project will require the timeline extension approved by HUD on February 13, 2017.

Table 4: RBD Meadowlands Project Schedule

Milestone	Time Period by Month/Year
Recommendation of Preferred Alternative	October 2017
Draft Environmental Impact Statement (DEIS) Public Hearing	November 2017
Final Environmental Impact Statement (FEIS)	April 2018
Record of Decision (ROD)	May 2018
Design Completion	December 2019
Construction Contract Awards (Multiple contracts anticipated)	December 2018 through December 2019
Construction Completion	September 2022

The Project includes four main phases: (1) planning and feasibility, (2) design and predevelopment, (3) site development and construction, and (4) post construction. At this time, the project team is in the process of developing the DEIS and conducting the Feasibility Study. Once these analyses are complete and the ROD is signed, the Project would proceed directly into the design phase with the existing contractor. The Project predevelopment phase began in 2015 when the first RFP was awarded and will be complete in 2019 when construction is estimated to begin. Predevelopment, refers to all design and engineering work required for the Project and culminates with complete construction specifications. A description of the scope of work, key tasks, and key deliverables for the four Project phases is provided in **Section 3.1** through **Section 3.4**.

Given the Preferred Alternative has not been selected for the Project, the estimated Project timeline is preliminary and subject to change. These estimates will continue to be refined following completion of the Final ROD and FEIS.

3.1 Planning and Feasibility

- **Scope of work:** overall project/sub-component feasibility, identification of available and potential resources, project timeline, initiation of the environmental review process, project scoping, critical issues/obstacles analysis; alternatives analysis, general cost-benefit analysis, bid packages for design phase, permit identification, EIS and ROD, initiation of the master planning process and community engagement/outreach, and identification of necessary land acquisition and easements.
- **Key tasks:** conduct data collection and analysis;, evaluate overall project feasibility, assess and confirm feasibility of RBD team's conceptual design, create concept drawings, publish Notice of Intent, develop purpose and need for project, develop scoping document, meet with stakeholders, identify necessary permits, prepare and publish the DEIS, receive and respond to public comments, hold a public hearing, prepare and publish the FEIS, prepare and post the ROD, identify the environmental consequences, identify and analyze critical issues/possible obstacles, identify necessary real estate/easements, develop more detailed timeline and budget estimates, and analyze feasibility of sub-components as stand-alone projects.
- **Key deliverables:** development of concept drawings, DEIS, FEIS, ROD, a list of necessary permits, feasibility report, general timeline and budget for various project phases, general benefit-cost analysis (BCA), plan for addressing critical issues, and bid packages for design and engineering services (including issuance of them).

3.2 Design and Predevelopment

- **Scope of work:** development of engineering and design documents, real estate/easement acquisition, development of construction bid package, completion of environmental review process, and issuance/approval of all necessary permits
- **Key tasks:** pursue the identified financing/funding opportunities, draft engineering and design documents, develop construction bid packages, obtain necessary permits, obtain real estate/easements, identify and secure funding source and partners for operations and maintenance, and identify long-term ownership entity/structure
- **Key deliverables:** concept drawings, complete engineering plans and design documents, approval of all necessary permits, completion of necessary easements and land acquisition, issuance of construction bid packages, completion of procurement of construction services contract, detailed construction timeline and cost estimate, and comprehensive BCA report.

3.3 Site Development and Construction

- **Scope of Work:** begin and complete site development and construction activities.

- **Key Tasks:** prepare identified areas of the Project Area for the construction phase on time, on budget, and in accordance with plans and specifications; and construct the Project on time, on budget, and in accordance with the construction plans and specifications.

- **Key Deliverables:** complete site development in areas required in order to begin construction, and complete construction of the Project components.

3.4 Post Construction

- **Scope of work:** all ongoing operations and maintenance to ensure continued effectiveness of project components.

- **Key tasks:** create maintenance agreements.

- **Key deliverables:** well-maintained project components and funding in place to ensure continued effectiveness of the Project.

SECTION 4: OUTREACH AND PUBLIC COMMENT FOR RBD MEADOWLANDS PROJECT

4.1 Citizen Outreach Plan

NJDEP has committed to a robust community and stakeholder outreach process throughout the course of what will be a multi-year effort to realize the Meadowlands RBD Project. The primary goal of NJDCA's Citizen Participation Plan (CPP) is to provide all New Jersey citizens with an opportunity to participate in the planning, implementation, and assessment of the State's CDBG-DR Sandy recovery program(s). The CPP required that a Citizen Outreach Plan (COP) specific to the Project be developed to serve as a supplement to NJDCA's existing CPP.

NJDEP developed the RBD Meadowlands COP in accordance with Section VI of Federal Register Notice FR-5696-N-11, the National Environmental Policy Act (NEPA), the Council of Environmental Quality's (CEQ) NEPA regulations (40 CFR Part 1506.6), and NJDCA's Language Access Plan (LAP; available at http://www.renewjerseystronger.org/). Community stakeholders will be engaged during all Project phases (see **Sections 3.1** through **3.4**).

The COP guides the engagement of stakeholders in the Meadowlands region and solicits their input on the Project through a multi-faceted public participation process that includes: the establishment of an Executive Steering Committee, Outreach Subcommittee, Citizen Advisory Group, Public Meetings, dedicated websites, an email listserv, a citizen complaint procedure, and press releases. The outreach strategies and techniques specific to the RBD Meadowlands Project are further described below. A copy of the RBD Meadowlands COP is available on the Project website at www.rbd-meadowlands.nj.gov.

4.1.1 Executive Steering Committee

The RBD Meadowlands Project has an Executive Steering Committee (ESC). The role of the ESC is to collaborate, exchange information and offer a forum for ESC members to provide input to the NJDEP throughout all phases of the RBDM Meadowlands Project. The ESC discusses the direction of the Project, the Project schedule, Project related policy issues, and any concerns raised by the public to the mayors and NJDEP.

The ESC is chaired by the NJDEP Commissioner and/or his delegates; it includes representatives from HUD, the NJDEP RBD Meadowlands project team, the Meadowlands Commission, and most importantly the mayors and/or their designees from the municipalities affected by the Project. Other entities may be incorporated into the ESC as needed.

The ESC is an advisory board. All final Project decisions will rest with the Commissioner of NJDEP as the sub-recipient of CDBG-DR/RBD funds and the agency responsible for implementation of the RBD Meadowlands Project. The ESC works in unison with NJDCA, as the HUD CDBG-DR Grantee, as issues arise.

4.1.2 Citizen Advisory Group

The RBD Meadowlands Project has a regional Citizen Advisory Group (CAG). CAG members represent a variety of communities within the Project Area, and are composed of representatives appointed by both the municipalities participating on the ESC and the NJDEP RBD Meadowlands project team. The project team works to incorporate CAG members that represent regional interests.

The purpose of the CAG is to provide a forum for the exchange of information between the project team, key citizens, and citizen groups representative of the community. CAG members supplement the knowledge of local government officials; they will provide input throughout the development and implementation of the Project.

The role of NJDEP is to provide Project updates, explain processes and procedures on the various Project phases, solicit input from stakeholders and the public, and answer questions during major milestone CAG meetings. CAG members are responsible for bringing issues and concerns to the attention of the project team as well as sharing information presented to the CAG through their networks to their constituents, including members from vulnerable populations. The CAG members communicate the information obtained from their constituents to the project team, who in turn communicate this information to the larger ESC. Specifically, CAG members are expected to:

- Share information about the Project goals and objectives with their constituents;
- Share the processes and procedures that will be followed in implementing the Project;
- Determine what community priorities or concerns exist about the Project as it develops; and

- Bring the priorities, issues and concerns of the larger community to the attention of the Project team.

4.1.3 Environmental Impact Statement Outreach

The EIS public participation process is conducted in accordance with the requirements of NEPA. In addition to engaging with the public, NEPA requires thorough and complete documentation of participation by all involved government agencies and other interested parties in the process. Throughout the NEPA process, the public participation effort focuses on gathering input and dispersing information about the following key areas addressed in the EIS:

- Purpose of and need for the Project.
- Potential range of reasonable alternative actions, including the No Action Alternative.
- Methodologies that may be used to assess impacts on various resources. This typically includes reviewing baseline information and conducting surveys, modeling, or other analyses to estimate the impacts on resources (including, but not limited to, biological resources, socioeconomics, cultural resources, hazardous materials/waste, traffic conditions, air quality, and noise) as result of the Project.
- Potential impacts associated with implementing the considered alternatives and potential avoidance, minimization, reduction, compensation, and mitigation measures.

To date, the Project has involved significant local, State, and Federal coordination, as well as collaboration with the public, to build an understanding among stakeholders in the Project Area. This coordination has taken place in accordance with NEPA, 40 CFR Part 1506.6, and other agency regulatory requirements to ensure the public remains well informed and engaged throughout the Project.

4.2 Outreach Accomplishments to Date

The public has consistently been engaged in the development of the RBD Meadowlands Project. To date, NJDEP and its partners have held several community meetings for the Project. Information on these meetings and the materials presented to the public at each meeting are available on the Project website at www.rbd-meadowlands.nj.gov. A list of these events is provided below:

- **March 29, 2017** – CAG Meeting #8 (Alternative 1: Coastal Storm Surge Protection and Alternative 3: The Hybrid Option)

- **January 31, 2017** – CAG Meeting #7 (Alternative 2: Stormwater Drainage Improvements)
- **December 6, 2016** – CAG Meeting #6 (Alternative 1: Structural Flood Reduction Concept Development)
- **October 24, 2016** – CAG Meeting #5 (Ecology and Drainage Basin Opportunity Areas)
- **September 20, 2016** – CAG Meeting #4 (Concept Component Development Workshop)
- **August 11, 2016** – CAG Meeting #3 (Public Scoping Results and Alternative Screening Criteria and Metrics Meeting)
- **July 6, 2016** – Public Scoping Meeting for the RBD Meadowlands Project
- **May 17, 2016** – CAG Meeting #2B (Scoping and Data Gathering)
- **April 26, 2016** – CAG Meeting #2A (Community Workshop)
- **March 23, 2016** – CAG Meeting #1 (Purpose and Need, NEPA Process Overview)

Community involvement has been an integral part of the entire Project process. In order to facilitate communication with the community, NJDEP is making extensive use of the Project website (www.rbd-meadowlands.nj.gov). The Project website is an important tool used to communicate with the public by serving as a repository for documentation and information related to the Project. The website features resources such as presentations, videos, public notices, and documents for public review, which are made available for download within a few days following public meetings. The website will continue to function as a valuable resource for the community as the Project moves forward through the design and construction phases.

NJDEP is also utilizing an electronic mailing list (listserv) to facilitate ongoing contact with the community, transfer information, and invite people to public meetings. The database contains the names and addresses of the Project Area representatives, media organizations, representatives from the business community, and other interested stakeholders who signed up to receive updates via the website. At meetings, members of the public have been encouraged to add their email address to the listserv so that they can be notified of Project updates and schedules for upcoming meetings. In addition, the Project website also features a link allowing individuals to subscribe to the Project's listserv.

4.3 Public Comments

In accordance with HUD requirements, the Draft APA 22 will be made available for public comment over a period of at least 30 days. In addition, the State will hold a Public Hearing to solicit comments on the Draft APA 22. The Public Hearing for the Draft APA 22 for the RBD Meadowlands Project will be held at the following date, time, and location:

- **Date:** Thursday, May 11, 2017
- **Time:** 5-8 PM
- **Location:** Little Ferry Borough Hall, 215-217 Liberty Street, Little Ferry, NJ

Comments on the Draft APA 22 can be submitted in any of the following ways: (1) either orally or in writing at the Public Hearing; (2) via email at sandy.publiccomment@dca.nj.gov, using the subject header "**APA 22**"; or (3) mailed to NJDCA directly at:

New Jersey Department of Community Affairs
Attn: Laura Shea
Assistant Commissioner, Sandy Recovery Division
101 South Broad Street
PO Box 800
Trenton, NJ 08625-0800

Comments must be postmarked by May 22, 2017 in order to be considered. After the public comment period closes, the State will synthesize the comments submitted on the Draft APA 22. NJDEP will include responses to the comments deemed substantive within the Final APA 22 for the RBD Meadowlands Project that will be submitted to HUD for review and approval.

SECTION 5: RBD MEADOWLANDS BENEFIT COST PROCESS SUMMARY

Pursuant to FR-5696-N-11 and its implementation guidance, the State is required to submit with its Substantial APA a BCA, as well as a clear and concise narrative description of the BCA for the HUD-funded Project. Per CPD-16-06, HUD requires that CDBG-DR grantees examine RBD projects through the lens of a BCA because it is a valuable tool to help inform decision-making regarding public infrastructure investments. However, the BCA will not serve as the sole determinant as to whether a RBD Project plan may or may not be approved. CPD-16-06 provides guidance regarding content and format of the BCA.

The purpose of the Project is to reduce flood risk and increase the resiliency of the communities and ecosystems in the Project Area, thereby protecting infrastructure, facilities, residences, businesses, and ecological resources from the more frequent and intense flood events anticipated to occur in the future. Therefore, the Project Preferred Alternative will be designed to meet the following objectives:

1) Contribute to Community Resiliency
2) Reduce Risks to Public Health
3) Deliver Co-Benefits
4) Enhance and Improve Use of Public Space
5) Consider Impacts from Climate Change
6) Protect Ecological Resources
7) Improve Water Quality

At this time, the NJDEP has not recommended a Preferred Alternative for the RBD Meadowlands Project; therefore, a full BCA will not be presented in this section. Once the NJDEP identifies the recommended build alternative, the full BCA narrative will be provided in a subsequent APA, which is anticipated to occur at the conclusion of the DEIS process as envisioned in FR-5961-N-01.

The full BCA for the RBD Meadowlands Project will be prepared in accordance with the content and formatting requirements set forth in HUD Notice CPD-16-06 (issued April 20, 2016) and consistent with the general principles outlined in Office of Management and Budget (OMB) Circular A-94, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs." To the degree that a methodology or

approach deviates from the general principles in OMB Circular A-94, explanations and justifications will be provided.

The following sections describe the general BCA process that is being used to evaluate the Project alternatives and how it will be used to identify the Preferred Alternative.

5.1 BCA Process Description

The NJDEP has contracted with AECOM Technical Services to complete the engineering feasibility designs, quantity and cost calculations, analysis of flood resiliency capability and benefits, and other benefit studies needed to quantify the BCA. The analyses will be based on 2016 price levels and a 7 percent annual discount rate as required by OMB Circular A-94.

Many of the major Project features, such floodwalls, flood gates, and drainage pipes/channels have the potential to be effective for a period well beyond 50 years. For analytical purposes, costs and benefits will be evaluated over a 50-year period as both average annual values and total present value. The present value of future replacement cost for features with less than a 50-year life is evaluated as part of the O&M costs.

Given the Project Area's high vulnerability to flooding, the majority of benefits are associated with increased resiliency. The flood risk modelling approach selected for the resiliency analysis was the Hydrologic Engineering Center - Flood Damage Analysis (HEC-FDA) model developed by the Hydrologic Engineering Center of the United States Army Corps of Engineers (USACE). The HEC-FDA model was developed to perform integrated hydrologic engineering and economic analysis of flood risk.

For coastal storm surge flooding, the hydrologic module utilizes flood frequency and elevation data extracted from the current FEMA flood insurance study storm surge analysis. The analysis considers both the current flood risk data and the impacts of future sea level change.

In addition, the HEC-FDA model accounts for the existing tide gates and berms within the Project Area. These existing resiliency structures tie-off at approximately an elevation of 5 feet above mean sea level (NAVD 88) and provide a limited level of protection. Under current sea level conditions, the existing protection features have an approximately 4 to 10 percent annual chance of being overtopped or flanked. For the purposes of this analysis, two sea level change scenarios will be evaluated: an intermediate-low sea level change of 1.2 feet over 50 years and an intermediate-

high change of 2.4 feet over 50 years. In an intermediate sea level change scenario of 1.2 feet rise at Battery Park over 50 years, the annual probability of exceeding the existing protection increases to approximately 25 percent. As the BCA advances, the analysis will also assess the intermediate-high 2.4-foot sea level change.

The economic module of the HEC-FDA analysis includes information regarding the location, value, and vulnerability of every building in the modeled study area (i.e., Project Area) floodplain. The economic consequence of flooding has been calculated using guidance developed by both the USACE and FEMA. Generally, physical flood damage assessments are based on relationships developed and published by the USACE. Other aspects of vulnerability, such as the potential for injury or mortality, treatments for flood-related mental health impacts, and lost productivity, are generally based on procedures developed by FEMA, supplemented by guidance contained in HUD Notice CPD-16-06.

Please note, the risk analysis and BCA calculations presented during the finalization of the Feasibility Study for a Project will reflect results from on-going hydrodynamic modeling. Potential social and environmental benefits for a Project have been identified qualitatively herein. Where possible, these benefits will be quantified when a Preferred Alternative is selected and the final BCA is completed.

5.2 Description of Alternatives Evaluated for Project

The Project includes the construction and operation of flood risk reduction measures designed to address the impacts of inland and coastal flooding on the quality of the human environment due to both storm hazards and sea level change within the Project Area. To achieve this, NJDEP developed a variety of potential solutions and concepts with varying degrees of hard infrastructure features (such as bulkheads and/or floodwalls), soft landscaping features (such as berms and/or levees), and/or a series of drainage improvements, aimed at maximizing benefits to the Project Area, while minimizing costs and adverse environmental effects. The Project is being designed specifically to address the unique challenges and conditions that exist within this 5,405-acre Project Area, goaled on reducing flood risk, improving the quality of the human environment, and benefitting the Project Area's residents, including LMI communities, through enhanced public amenities.

Each of the three Build Alternatives being considered seeks to reduce the risk of flooding within the Project Area and each varies by the type of infrastructure that is proposed. Each alternative is being evaluated through the on-going Feasibility Study and application of site-specific screening criteria; each will be further developed and

modified as the process proceeds. As directed by HUD, alternatives must be implementable within the limits of the CDBG-DR funding available by September 30, 2022. As currently proposed, the three Build Alternatives are summarized in **Section 2** and are known as Alternative 1 (Structural Flood Reduction Alternative), Alternative 2 (Stormwater Drainage Improvement Alternative), and Alternative 3 (Hybrid Alternative).

The Project is planned to be completed by September 2022. The estimated useful life of the Project is 50 years, or approximately 2022 through 2072.

5.3 Project Cost

For the RBD Meadowlands Project, the NJDEP proposes to use only the $150 million in CDBG-DR funds provided by HUD for the design, engineering, program management, construction, and other functionally related costs.

5.4 Description of Existing Problem

As demonstrated by Superstorm Sandy, the Project Area is subject to periodic, devastating flooding during large storm surges. In addition, repetitive flooding occurs throughout the Project Area due to both intense rainfall events and from smaller storm surges that block the existing tide gates. In general, there are three distinct sources of flooding in the Project Area:

- Storm surge overwhelming the existing Line of Protection;
- Rainfall trapped behind the existing gates and levees at high tide; and
- Limits in the capacity of the existing drainage structures, resulting in flooding during rainfall-only events.

The main source of flooding in the Project Area is coastal flooding from storm surges and spring high tides. Coastal flooding occurs less frequently than inland flooding, and often accompanies tropical storms. During these events, the tidally influenced Hackensack River surges over its banks and inundates the Project Area floodplain.
The Project would minimize the likely future impacts from coastal and rainfall flooding and would provide protection for public health and safety, and the economic vitality of the communities in the Project Area.

5.5 Risks If RBD Meadowlands is Not Implemented

Future conditions in the Project Area without implementation of the Project are

assumed to include:

- Continued flooding from tidal surges during severe future coastal storm events;
- Continued flooding during heavy rainfall events and local drainage problems; and
- Increased exposure to the effects of climate change and sea level change, with an anticipated 1.2 to 2.4 feet rise in the Project Area by the year 2073.

Overall, increased and more frequent flooding events within the Project Area over time would result in increases in adverse effects to the local community and its citizens. Effects to low-income, elderly, and disabled populations would increasingly be disproportionately impacted by flooding, including the concentrated areas of poverty in the Boroughs of Teterboro and Little Ferry and in the Township of South Hackensack. During the initial screening of the Project's alternatives, flood protection measures that would provide protection from coastal storms that were the magnitude of Superstorm Sandy were eliminated due to the Project's funding limitations.

5.6 List of Benefits and Costs of the RBD Meadowlands Project

The benefits calculated for the Project are based on a comparison of future conditions with or without implementation of the overall Project. The costs of the Project include estimated costs associated with environmental remediation, O&M, and other costs.

The benefit analysis assumes that certain conditions would exist in the future. Changes in the future condition assumptions from those anticipated in the BCA calculations could result in higher or lower benefits than currently estimated.

The primary resiliency benefit of the alternatives is reducing direct damages from flooding to infrastructure, residential, and commercial structures in the Project Area. These benefits are captured using a HEC-FDA model of damages in both the existing and Proposed Project conditions. In addition to providing direct resiliency benefits by reducing flood damages to homes, businesses, and infrastructure, the alternatives being considered have the potential to generate additional environmental, social, and economic benefits, as well as other resiliency benefits.

The alternatives may generate environmental benefits related to urban heat-island effect, air quality, nutrient pollution, water quality, and habitat creation. Additionally, the alternatives may provide social benefits by offering access to the

waterfront, enhanced recreation, increased mobility, and aesthetic improvements. Potential economic benefits considered include positive and increased employment, property values, and business impacts. A more detailed analysis and discussion of the resiliency, environmental, social, and economic benefits will be presented in the full BCA.

Table 5 identifies specific resiliency, environmental, social, and economic benefits that could be realized from the three Build Alternatives presented in **Section 2.2.2**. The "$" symbol indicates that the benefit that has been or will likely be monetized in the full BCA; a "Q" indicates that the benefit will be assessed qualitatively in the full BCA; and "N/A" indicates that the benefit does not apply to this Project.

Table 5: Resiliency, Environmental, Social, and Economic Benefits Provided by the Alternatives

Benefits		Qualitative or Quantitative Assessment
Resiliency	Reduced Structural Damage	$
	Decreased Loss of Life and Injuries	$
	Mental and Physical Health Improvements	$
	Decreased Emergency Response Costs	$
	Reduced Displacement	$
	Reduced Vulnerability of Energy and Water Infrastructure	N/A
	Decrease in Small, Frequent Flood Events	$
	Reduced Energy Use	Q
	Noise Level Reductions	N/A
	Air Quality Improvements and Greenhouse Gas Emissions Reductions	Q
	Wetland Enhancement and Creation	Q
	Water Quality Improvements and Reduced Stormwater Runoff	Q
	Urban Heat-Island Effect Reductions	Q
Social	Reductions in Human Suffering	$
	Benefits to Low-and-Moderate Income Persons	$
	Enhanced Recreational Opportunities	$
	Aesthetic Improvements	$
	Increased Mobility	Q
	Access to the Waterfront	Q
	Greater Housing Affordability	N/A
Economic Revitalization	Improved Retail Sales	Q
	Increase in Employment Opportunities	Q
	Appreciating Property Values and Increased Property Tax	Q

As described above, the overall Project provides a wide range of beneficial impacts. For example, both the costs and resiliency benefits can be evaluated in quantitative terms to allow for development of a Benefit to Cost Ratio (BCR).

5.7 Description of Risks to Ongoing Benefits from Overall Project

The overall Project is being designed to provide resilience and community benefits to the residents and businesses in the Project Area. The risks are events or issues that would influence a Project's projected benefits during the lifecycle of the Project, such that those benefits would not be realized or recognizable, or would not be realized to the level anticipated. These risks could occur extraneously from a Project for various reasons or unpredictable events. Below is a list of potential risks that may occur with the potential to impact the Project's achievement of benefits:

- Rapid Sea Level Change
- Timing Issues
- Change in Social and Recreational Values
- Decrease in Businesses/Warehouses
- Decline in Resident Population

In the full BCA for the Preferred Alternative, this section will provide a detailed description of the risks to achieving the anticipated benefits of the Project in accordance with the guidance provided in CPD-16-06. In addition, the Project's ability to adapt or be adapted to any of these risks will be discussed, as applicable.

5.8 Assessment of Project Challenges

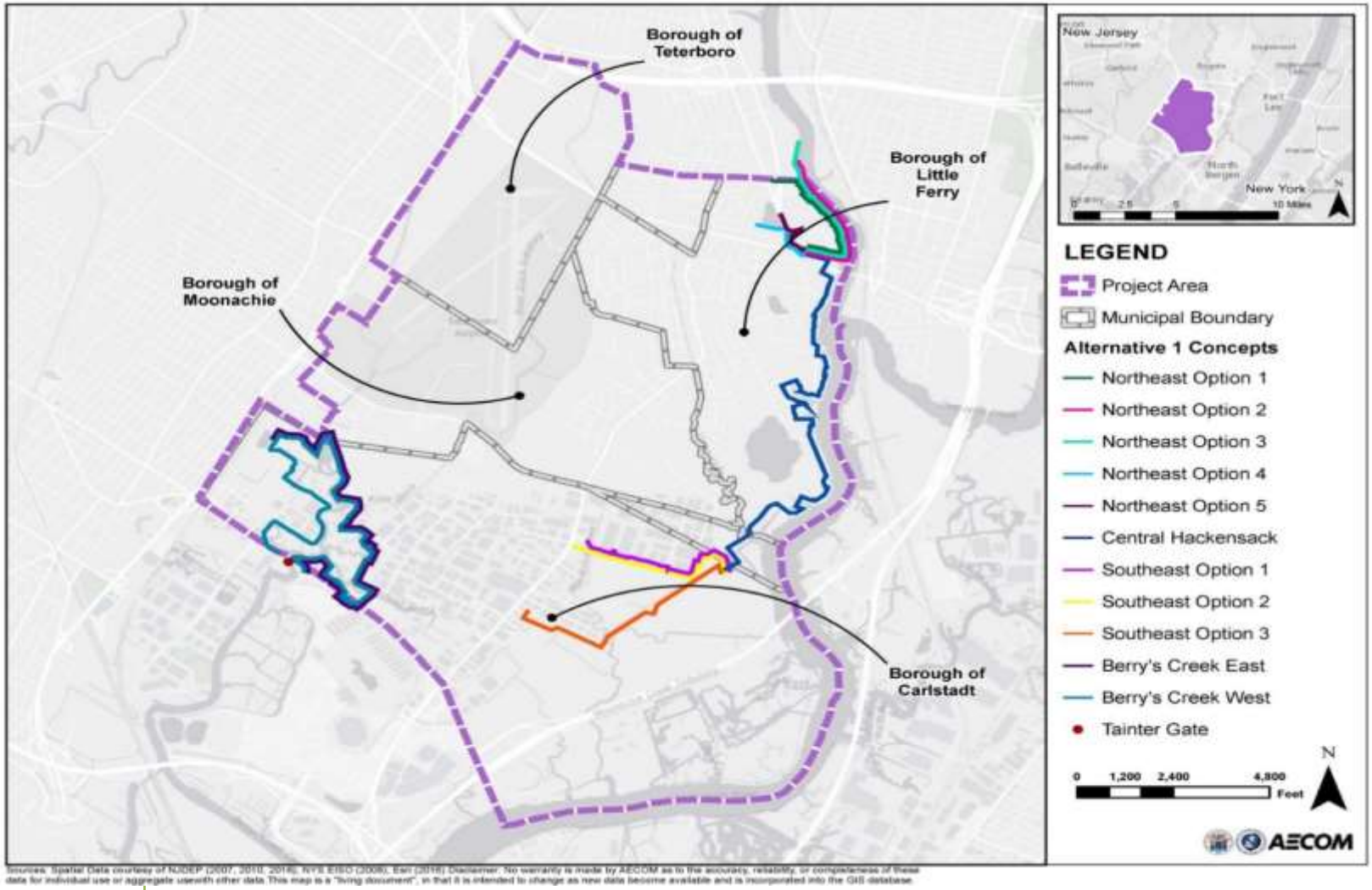
A number of challenges can be encountered when implementing a project that covers a large, populated area and over a long period of time. As the Project moves forward to the recommendation of a Preferred Alternative, these project challenges will be identified and refined.

Some of the anticipated Project challenges that will need to be addressed and considered with the Preferred Alternative include:

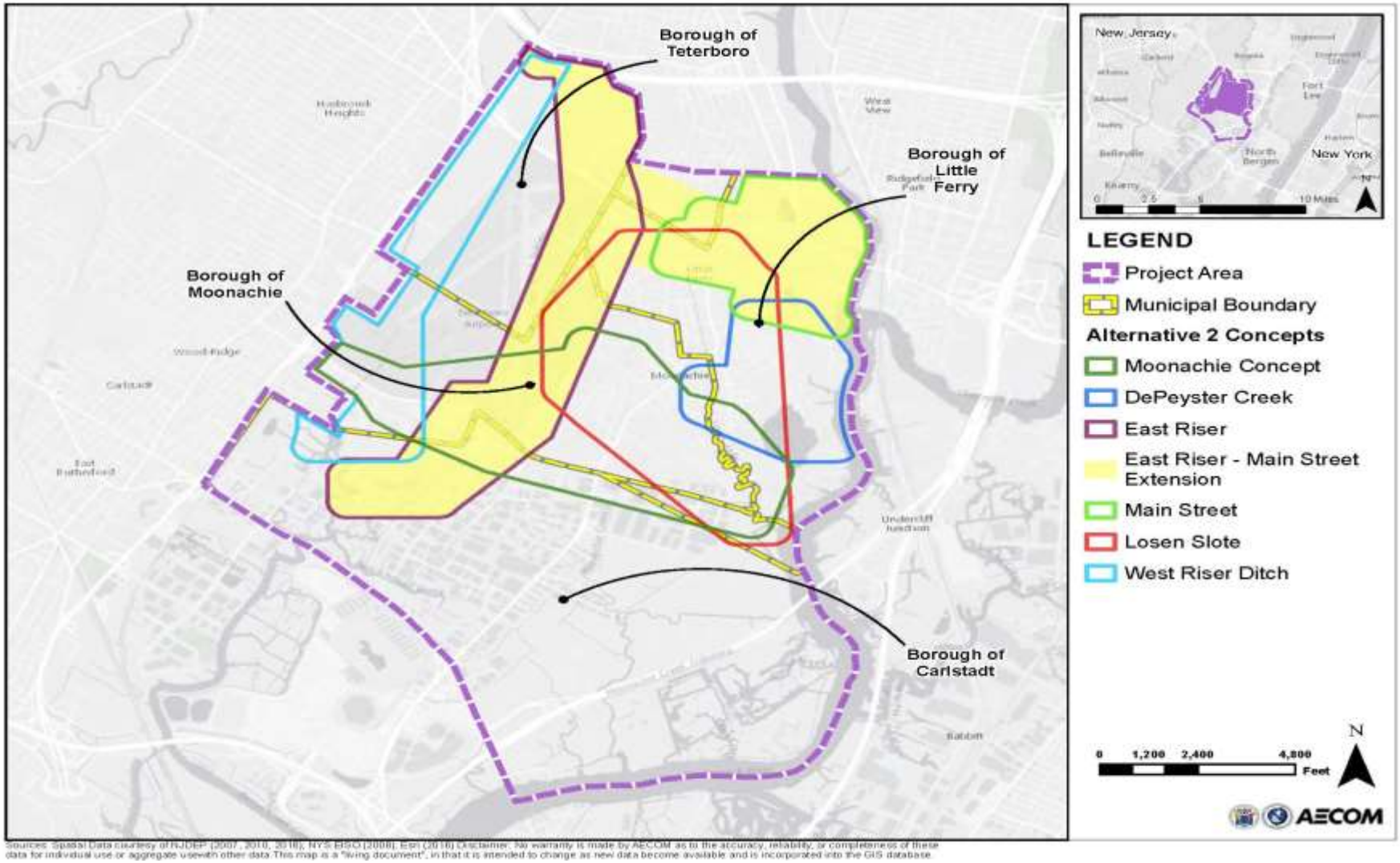
- Real estate acquisition, including both monetary costs and time delays;
- Future O&M investments;
- Increased provisional costs;
- Construction challenges associated with urban areas
- Availability of the necessary mitigation credits for wetlands and riparian zones; and
- Issues related to both known and unknown contaminated areas within the Project Area

These issues may occur in various stages of a Project implementation: ongoing feasibility, design, construction, or O&M. The challenges can be centered on costs, logistics, or coordination.

Appendix A: Alternative 1 – Line of Protection

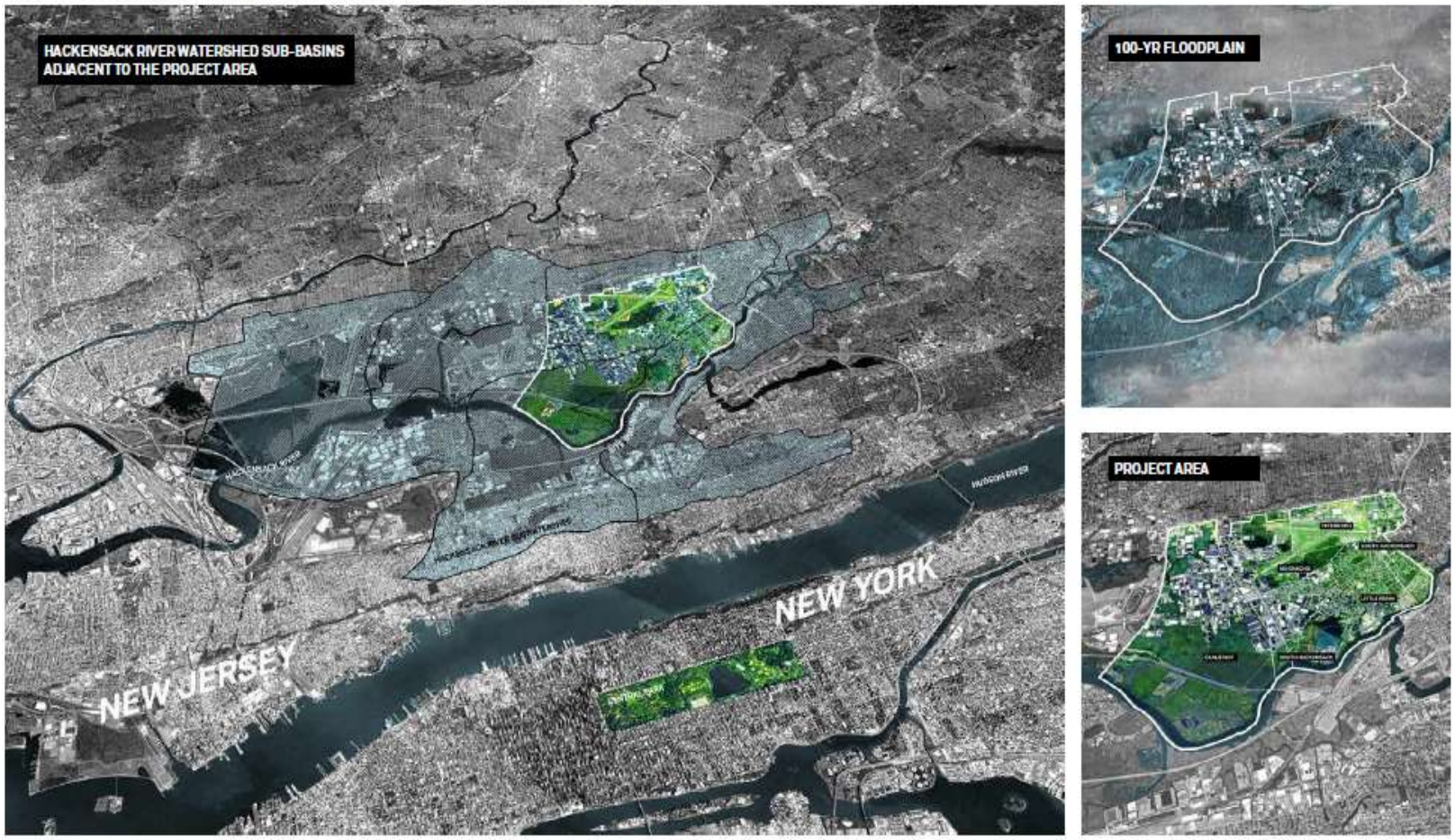


Potential Alignments within Alternative 1 Line of Protection



Alternative 2 Seven Concepts Carried Forward for Development

HACKENSACK RIVER WATERSHED AND THE 100-YR FLOODPLAIN



Hackensack River Watershed and 100-Year Floodplain for the Study Area

Appendix B: Alternative 2 Concepts[1]

Concept Name/General Location	Number of Concepts	Approximate Concept Boundaries	Key Features
1. Main Street, Little Ferry	6	**North:** Indian Lake and Lakeview Fields **East:** Hackensack River **South:** Willow Lake **West:** Liberty Street Also, possible inclusion of Main Street/US Route 46 west to Huyler Avenue	• Local drainage improvements to Main Street • Open space improvements to Indian Lake Park and Willow Lake Park • New open space along the Hackensack River waterfront • Improvement of three pump stations and installation of one new pump station • New force mains along Main Street and/or Washington Avenue
2. DePeyster Creek	3	**North:** Washington Avenue **East:** Hackensack River **South:** Mehrhof Pond **West:** Losen Slote Creek	• Bioretention basin and berms along DePeyster Creek • Improvement/relocation of the DePeyster Creek pump station • New open space along the Hackensack River • Open space improvements to Losen Slote Creek Park
3. Losen Slote Creek	1	Losen Slote Creek corridor, from approximately Main Street in the north, to its confluence with the Hackensack River in the south	• Channel improvements, a settling basin, and a wetland improvement along the southern portion of Losen Slote Creek • Installation of a force main along the northern portion of Losen Slote Creek
4. Park Street Area	2	**North:** Garfield Street and Main Street **East:** Marshall Avenue and Bertolotto Avenue **South:** Capital Drive **West:** State Street and Redneck Avenue	• Channel improvements and a force main along the upper portion of Losen Slote Creek • Wetland improvement in the northern portion of Losen Slote Creek Park • Open space improvements near the Robert L. Craig Elementary School and Bailey Park • Extensive bioswales, rain gardens, and permeable paving throughout the Park Street Area

[1] Please note that the individual concepts within each general location differed in precise geographic footprint, and that the boundaries provided are meant to encompass an area that contains all of the concepts for the general location. Please also note that the potential key concepts listed within each general location do not mention the small green infrastructure elements, such as bioswales, rain gardens, permeable paving, and/or median plantings, although most of the individual concepts did include these components. This omission is due to the relatively broad scale of planning conducted during this initial stage.

Concept Name/General Location	Number of Concepts	Approximate Concept Boundaries	Key Features
5. All West Riser Ditch	2	West Riser Ditch corridor, from I-80 in the north to approximately Starke Street in the south	• Channel improvements and berms along the entirety of West Riser Ditch • Two new pump stations and one improved pump station • Green street improvements along Moonachie Avenue
6. All East Riser Ditch	1	East Riser Ditch corridor from approximately I-80 south to Starke Road in Carlstadt	• Channel improvements along East Riser Ditch • Two new pump stations • New open space along Caesar Place
7. Upper East Riser Ditch	3	**North:** I-80 **East:** Huyler Street **South:** US Route 46 **West:** Green Street and Hollister Road	• Channel improvements and a bioretention basin along East Riser Ditch • New pump station near the intersection of Green Street and I-80
8. Middle East Riser Ditch	2	**North:** US Route 46 **East:** Redneck Avenue and Jackson Place **South:** Moonachie Avenue **West:** Eastern runway at Teterboro Airport	• Channel improvements along East Riser Ditch • Local drainage improvements and open space improvements to Redneck Avenue Park • Green street improvements along Moonachie Avenue and Redneck Avenue
9. Lower East Riser Ditch	4	**North:** Moonachie Avenue **East:** Commercial Avenue **South:** Starke Road **West:** Berry's Creek and Metropolitan Mobile Home Park	• Channel improvements to East Riser Ditch • Bioretention basins, wetland improvements, and off-channel storage • New open space along Caesar Place, Moonachie Avenue, and Dell Road • Local drainage improvements to Metropolitan Mobile Home Park and Vanguard Associates Mobile Home Park
10. Carol Place	3	**North:** Joseph Street and East Joseph Street **East:** Losen Slote Creek **South:** Empire Boulevard **West:** Redneck Avenue Also, possible inclusion of Moonachie Avenue west to approximately State Route 17	• Channel improvements and off-channel storage near Empire Boulevard and Moonachie Road • Local drainage improvements and open space improvements to Redneck Avenue Park • Green street improvements to Moonachie Avenue, Redneck Avenue, and Empire Boulevard
11. Gotham Parkway	3	**North:** Empire Boulevard **East:** Washington Avenue **South:** Paterson Plank Road (State Route 120) **West:** Gotham Parkway	• Channel improvements and berms along Peach Island Creek • Two new pump stations along Gotham Parkway